DEPARTMENT OF THE AIR FORCE *AFOTEC PAMPHLET 99-102, VOLUME 2*
HQ Air Force Operational Test and Evaluation Center *1 AUGUST 1994*

Test and Evaluation

SOFTWARE SUPPORT LIFE CYCLE PROCESS EVALUATION GUIDE

The purpose of this pamphlet is to provide the Air Force Operational Test and Evaluation Center (AFOTEC) software test manager and the deputy for software evaluation information needed to evaluate software life cycle processes as they influence overall software supportability. In this pamphlet are the means to track the processes affecting software supportability, beginning as early as necessary to provide insight into the quality of the evolving software products, software support resources, and operational support life cycle procedures themselves.

SUMMARY OF CHANGES

AFOTEC Pamphlet (AFOTECPAM) 99-102 replaces AFOTEC Pamphlet 800-2, all volumes. Minor administrative changes were made to reflect Air Force major command reorganizations. This volume is the second in a series of Software Operational Test and Evaluation pamphlets prepared by the Software Analysis Team at Headquarters (HQ) AFOTEC. Local reproduction of all volumes in this series is authorized. Comments should be directed to the office of primary responsibility. The pamphlets in the series are:

AFOTEC Pamphlet 99-102, volume 1 - Management of Software Operational Test and Evaluation

AFOTEC Pamphlet 99-102, volume 2 - Software Support Life Cycle Process Evaluation Guide

AFOTEC Pamphlet 99-102, volume 3 - Software Maintainability Evaluation Guide

AFOTEC Pamphlet 99-102, volume 4 - Software Usability Evaluation Guide

AFOTEC Pamphlet 99-102, volume 5 - Software Support Resources Evaluation Guide

AFOTEC Pamphlet 99-102, volume 6 - Software Maturity Assessment Guide

AFOTEC Pamphlet 99-102, volume 7 - Software Reliability Evaluation Guide

AFOTEC Pamphlet 99-102, volume 8 - Software Operational Assessment Guide

1. General. Software supportability is a measure of the adequacy of products, resources, and procedures to facilitate the support activities in establishing an operational baseline, modifying and installing software, and meeting user requirements. Software supportability is a function of the quality of the software products, the capabilities of the software support resources, and the adequacy of the life cycle processes that affect the procurement, development, and operational support of the software. The focus of this guide is the life cycle processes of software project management and software configuration management as they affect the eventual supportability of fielded software.

2. Overview:

2.1. You should read pages 1 through 16 in their entirety and understand the evaluation concept and procedures before beginning any portion of an evaluation. These pages provide you with:

Supersedes AFOTECP 800-2, vol 2, 1 Nov 88 Certified by: SA (Col D.L. Brazil)
OPR: SAS (Maj Michael Woltz) Pages: 259/~~Distribution: F~~

2.1.1. A background of the AFOTEC software support life cycle process evaluation concept.

2.1.2. A basic understanding of the evaluation procedures.

2.1.3. Detailed instruction for using the software life cycle process questionnaires.

2.2. Attachment 1 contains the questionnaire and explanatory information on each question. This elaborating information is provided to ensure that you fully understand the intent of each question. Included are definitions of terms, examples, explanations, and special case response instructions, as necessary. Attachment 1 is designed to be used as the source of questions for the evaluation. Attachment 1 is also designed to allow you to make written remarks for later reference. Questions are *not* listed in order of importance.

2.3. Attachment 2 contains a summary list of all the questions for quick reference. Attachment 3 is a matrix showing when the questions should be answerable by milestone review or time phase. Attachment 4 is a glossary of terms.

3. Methodology Description and Factors:

3.1. **Software Life Cycle Process Evaluation Method:**

3.1.1. The method for evaluating the software life cycle process is based on the use of closed-form questions with optional written comments justifying the evaluation score assigned to a question. This questionnaire is designed to determine the degree to which certain desirable attributes or characteristics affecting software supportability are or will be part of the software life cycle process. The elements of the software life cycle process and their relationships are shown in figure 1 and are described in the following paragraphs. The hierarchical evaluation structure shown in the figure enables you to identify potential software supportability problems at various levels: category/major factor (project management, configuration management), attributes or characteristics (planning, organizational structure, design methods, implementation methods, test strategies, and project interfaces), low-level characteristics (individual questions), or some combination. Each question should be evaluated on the basis of the attribute or characteristic to which it is attached.

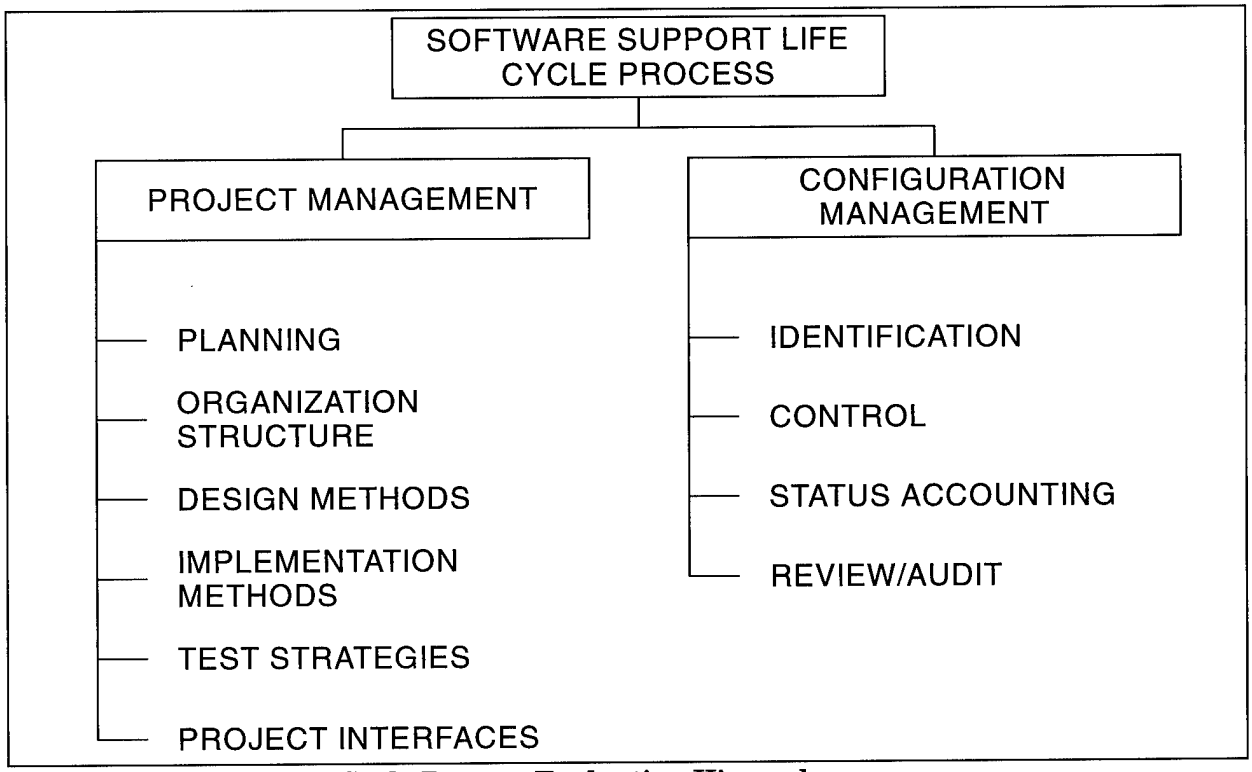


Figure 1. Software Life Cycle Process Evaluation Hierarchy.

3.1.2. Software life cycle process management is a combination of the policy, methodology, procedures, and guidelines applied in a software environment to the software development and support life cycle activities. The major management aspects for purposes of software supportability can be grouped into two major factors: software project management and software configuration management. These major factor characteristics are evaluated with respect to their impact on software supportability. They are evaluated over the entire life cycle of a system with emphasis on three activities: procurement, development contractor, and operational support. Each activity concentrates on a series of events, actions, and documents that make up the life cycle management process.

3.1.3. Software project management is concerned with producing a software product: either the initial production baseline or a version of the production baseline. During development, many management characteristics will influence the supportability of the software. The procurement activity will manage the overall project including planning for supportability. The development contractor will manage the delivery of the production baseline within the procurement activity requirements. During the post-deployment of a system, the software support activity directly controls the baseline update process. Lack of planning, poor organizational structure, and inadequate design/ implementation/test procedures during any activity affect the supportability of the resulting software product.

3.1.4. Software configuration management will provide a means to:

3.1.4.1. Identify and document the functional and physical characteristics of a configuration item.

3.1.4.2. Control changes to those characteristics.

3.1.4.3. Record and report change processing and implementation status.

The three areas that produce these results are configuration identification, configuration control, and configuration status accounting. A fourth area, configuration audits, verifies that a completed product and its documents meet contractual requirements. The procurement, development, and operational support activities all have configuration management responsibilities to ensure that the baseline production products and subsequent revisions are properly controlled. These configuration management responsibilities have an impact on the supportability of the software products.

3.2. **Software Configuration Management Evaluation Factors.** The software project management evaluation is based on six characteristics or evaluation factors: planning, organization structure, design methods, implementation methods, test strategies, and project interfaces. The following paragraphs define these factors and discuss their application in the evaluation process.

3.2.1. **Planning:**

3.2.1.1. Planning is evaluated for how well the life cycle plans address software supportability. Software project management planning enhances software supportability to the extent that plans for the development, test, product transfer, and operational support exist have been implemented, have been appropriately coordinated across responsible agencies, and satisfy contractual and/or regulation requirements.

3.2.1.2. Major planning documents for the procurement activity include the program management directive (PMD), program management plan (PMP), test and evaluation master plan (TEMP), computer resources lifecycle management plan (CRLCMP), development test and evaluation (DT&E) plans, and operational test and evaluation (OT&E) plans.

3.2.1.3. Major planning documents for the development contractor activity include the statement of work (SOW), system/segment specification or prime item development (PID) specification, software development plan (SDP), software configuration management plan (SCMP), software quality program plan (SQPP), software standards and procedures manual (SSPM), the software test

plan (STP), and the computer resources integrated support document (CRISD).

3.2.1.4. Major planning documents for the operational support activity include the TEMP, DT&E and OT&E plans, and CRLCMP.

3.2.1.5. One of the most important results of good planning is the coordination of information across the various planning documents to minimize redundancy and satisfy the necessary content requirements of the plans. The conciseness and level of detail of planning information is very important. Frequently, plans act as a place holder for "real" information, serving a role only a little better than a "TBD." To say that structured programming standards will be followed is not precise enough in the SSPM. Precise programming requirements which represent the contractor's definition of "structured programming standards" must be specified in a manner suitable for quality assurance testing for conformance. As another example, it is not satisfactory to indicate in the CRLCMP that the support resources space requirements are 4,800 square feet. It is necessary to indicate how that space is allocated among support personnel office space, support hardware space, storage/library space, and any other space allocations which might be peculiar to the application. Furthermore, a top-level facility layout showing the physical relationship among the space allocations is appropriate.

3.2.1.6. When systems have interservice operability requirements, plans for the appropriate interservice interfaces and joint activities should be clearly specified, particularly the plans for supporting the software.

3.2.1.7. When development contractor activity involves subcontractors, the plans for managing the subcontractor effort and the subcontractor internal plans for managing their efforts should be clearly specified, particularly the plans for supporting deliverable software.

3.2.1.8. A good plan will possess a concise statement of the objectives of the plan, the techniques and methods by which the plan will be implemented, the responsible organizational elements for making sure the plan is implemented and evolved as necessary, the schedule by which the objectives of the plan are to be accomplished, and the relationships of the plan to any other system elements.

3.2.2. **Organizational Structure:**

3.2.2.1. The software project management organizational structure enhances software supportability to the extent that the physical structure, functional responsibilities, external interfaces, and assigned personnel provide for continuity over the software life cycle phases and have proper interfaces with organizations responsible for software supportability.

3.2.2.2. The procurement activity must have an organizational structure which provides continuity across all life cycle phases and through each milestone. The organization structure must provide for adequate dissemination and coordination of information among all activities. Organization elements must provide functions for project oversight (plans and policies), configuration management, quality evaluation, project reviews and audits, testing and evaluation, and transfer of responsibility.

3.2.2.3. The development contractor activity must have an organizational structure which matches the work breakdown structure and provides continuity throughout all engineering and manufacture development activities and the transition into postdeployment support. Appropriate organizational elements should exist for internal configuration management, quality assurance, test and evaluation, product development, and procurement/support contractual interface activity.

3.2.2.4. The operational support activity must have an organizational structure which satisfies mission requirements within the requirements imposed by the procurement and development activity organization and applicable regulations and directives. Organization elements should be established early in the development phase to ensure proper transition to postdeployment support through understanding of the software support requirements.

3.2.3. **Design Methods:**

3.2.3.1. Design methods are evaluated for characteristics which indicate that software supportability has been designed into the software products. Software project management utilizes design methods which enhance software supportability to the extent that design methodology standards and conventions (1) are documented, followed, and validated through quality assurance; (2) can be transitioned to support activity; and (3) produce adequate design specifications which reflect supportability characteristics.

3.2.3.2. The procurement activity design methods are reflected in the requirements imposed upon the development contractor activity through the system/segment specification and the request for proposal. Procurement monitoring of development contractor design activities and acceptance of those activities are also a reflection of the procurement activity design methods.

3.2.3.3. The development contractor activity design methods should be defined in an internal standards and convention manual and validated by a quality assurance function. The methods should reflect use of a consistent methodology, traceability between requirements and production products, traceability of design decisions, use of abstraction and information hiding, and use of techniques to enhance the software product characteristics of modularity, descriptiveness, consistency, simplicity, expandability, and instrumentation. Automated tool support as an aid to development design and support design evolution is an important part of the development contractor design methods.

3.2.3.4. The operational support activity design methods should be defined at a high level in a procurement activity requirements specification and at a lower level by an internal support standards and conventions manual. The methods should have a close similarity to the methods used by the development contractor activity in order to facilitate transition of the software design evolution to the support activity.

3.2.4. **Implementation Methods:**

3.2.4.1. The software project management process uses implementation methods which enhance software supportability to the extent that implementation/coding/testing methodology, standards, and conventions (1) are documented, followed, and validated through quality assurance; (2) can be transitioned to the support activity; and (3) produce supportable production products.

3.2.4.2. The procurement activity implementation methods are reflected in the requirements (contract specifications) imposed on the development contractor activity for implementation and coding standards *and the process* through which such standards and the form of the production products are reviewed and accepted for operational use.

3.2.4.3. The development contractor activity implementation methods should be defined in an internal standards and conventions manual and validated by a quality assurance function. The methods should reflect use of acceptable implementation team organizational strategies. For example, the chief programming team methods should enhance traceability among requirements, design, and product. The methods should emphasize techniques to enhance the software product characteristics of modularity, descriptiveess, consistency, simplicity, expandability, and testability. Automated tool support to aid development implementation and change processing is an important part of development contractor implementation methods.

3.2.4.4. The operational support activity implementation methods should be defined at a high level in a procurement activity requirements specification and other support documents such as the CRLCMP. Specific methods should be defined at a low level by an internal standards and conventions manual. The methods should have a close similarity to the methods used by the development contractor activity in order to facilitate transition of the software implementation evolution to the support activity.

3.2.4.5. Implementation methods are evaluated for consistency with standards, availability of automated tool support capabilities in the form of software benches and inte-

grated laboratory testbeds, potential for effective use during software support, and the traceability of implemented product status and top-level requirements.

3.2.5. **Test Strategies:**

3.2.5.1. Test strategies are evaluated for how well the strategies provide for a delivery of mature software products and retest of those products during software support activities. Software project management utilizes test strategies which enhance software supportability to the extent that the test plans, descriptions, procedures, and results (1) have been documented, (2) can be transitioned to and reused by the support activity, and (3) provide for a consistent and systematic process for verifying and validating that software requirements have been satisfied.

3.2.5.2. The procurement activity test strategies are documented in the TEMP, DT&E plans and reports, OT&E plans and reports, optionally in independent verification and validation (IV&V) plans and reports, the preliminary and formal qualification tests (preliminary qualification tests (PQT) and formal qualification tests (FQT)), and the acceptance strategies which revolve around formal reviews (e.g., system requirements review (SRR), preliminary design review (PDR), critical design review (CDR), test readiness review (TRR)) and audits (e.g., functional configuration audit (FCA), physical configuration audit (PCA)). The test strategies should clearly indicate software test objectives, relationships to system test objectives, relationships among the various test organizations (e.g., DT&E, OT&E, IV&V), contractually binding aspects of tests such as the schedule and deliverables, and precisely what tests will be required prior to acceptance of the production product. Test strategies should describe how software test discrepancies will be documented and tracked, corrections coordinated, and results passed to the test and eventual support organizations. A test strategy for the transition period after the production decision should be specifically addressed.

3.2.5.3. The development contractor activity test strategies are documented in test plans, procedures, and reports. Automated support in the form of software benches (individual module tests), laboratory integrated testbeds, and operational integrated systems have a major impact on the effectiveness of the tests. A clear strategy for use of such tools should be documented, used, and transitioned early to the support activity. These test strategies should address (1) features to be tested, (2) traceability to the requirements specifications, and (3) among the various test documents, a consistent approach to testing various levels (e.g., unit, integrated, system), environmental requirements, organizational responsibilities and interfaces, schedule, deliverables, risk and contingencies, and acceptance/approval criteria.

3.2.5.4. The operational support activity test strategies documentation is similar to the procurement activity (e.g., for the TEMP and FOT&E plans as dynamic documents) and the development contractor activity (e.g., via transition of the test plans/procedures/ results and automated tools to the support activity). Coordination between the operational activity and support activity test strategies is important during postdeployment because of the requirement to use operational testbeds. This coordination should be reflected via resource requirements in top-level planning documents such as the TEMP, CRLCMP, and specific software support management project (i.e., block release) internal documents. Similar test strategy characteristics as in subparagraphs 3.2.5.2 and 3.2.5.3 above should be present in the operational support activity test strategies.

3.2.6. **Project Interfaces:**

3.2.6.1. Organizational interfaces are evaluated for their effectiveness in resolving interorganization issues concerning software support. Software project management possesses organizational interfaces which enhance software supportability to the extent that external project organization relationships and responsibilities (1) are defined, (2) provide a valuable functional role, and (3) contribute to systematic cost effective procurement, development, operation, and support processes.

3.2.6.2. The procurement activity organizational interfaces are primarily with the devel-

opment contractor activity, the operational support activity, interface working groups required by regulations, and other higher level groups (e.g., military, Department of Defense (DoD), federal government agencies, Congress, public). An IV&V interface may also be required. It is necessary that each of these interfaces be defined to a level of detail consistent with the particular application system. Function and responsible persons should be identified.

3.2.6.3. The development contractor activity organizational interfaces include the procurement activity, interface working groups, and higher level internal organization elements (e.g., corporate management). An IV&V interface may also be required. In addition, if subcontractors are involved, this interface must be clearly established. Function and schedule of contact should be defined and responsible persons identified.

3.2.6.4. The operational support activity organizational interfaces are very similar to those of the procurement activity.

3.3. **Software Configuration Management Evaluation Factors.** The software configuration management evaluation is based on four characteristics or test factors: software configuration identification, software configuration control, software status accounting, and software audits. Definitions of these test factors and discussion of their application in the evaluation process are given in the following paragraphs.

3.3.1. **Software Configuration Identification:**

3.3.1.1. Configuration identification is evaluated for how well the controlled baselines are identified, unique identification problems such as multiple locations/version variations are solved, compliance with regulations and standards, and the use of automated tools to support generation and update of configuration indexes for the baselines. Software configuration management uses configuration identification to enhance software supportability to the extent that the software documentation properly identifies the configuration items, their characteristics, and their relationships according to required standards and regulations.

3.3.1.2. The procurement activity is responsible for following existing guidelines and regulations for identification of software configuration items and ensuring that these guidelines and regulations are contractually required by the development contractor. The procurement activity is also responsible for monitoring contractor use of the guidelines and regulations to ensure that the functional, allocated, developmental, and production software baselines are properly identified.

3.3.1.3. The development contractor activity is responsible for following contractual requirements for configuration management. This should include development of a software configuration management plan in which configuration identification standards and procedures for the controlled software baselines are specified. Independent of contractual requirements, internal configuration identification standards and procedures should exist.

3.3.1.4. The operational support activity is responsible for continuation of the same configuration identification requirements as required for the development contractor activity. In addition, certain monitoring responsibilities of the procurement activity are ensured by the operation support activity. The CRLCMP is the primary operation support activity software configuration management planning document.

3.3.2. **Software Configuration Control:**

3.3.2.1. Configuration control is evaluated for how well changes to the functional, allocated, developmental, and production baselines are controlled. This evaluation includes the adequacy of control procedures and forms, the capability to transition such procedures to the support activity procedures, the adequacy of the interface control among the organizations responsible for some aspect of configuration control, and the use of automated tools to protect inadvertent change and assist in administering approved changes. Software configuration management uses configuration control to enhance

software supportability to the extent change decisions to software baselines are made, administered, and implemented in a controlled environment.

3.3.2.2. The procurement activity makes decisions regarding changes to the developmental software baselines through a system configuration control board. Any change request to a functional, allocated, or production software baseline must be approved by the procurement configuration control board. The changes are administered by the program office's configuration management organization. Implementation is generally accomplished by the development contractor activity.

3.3.2.3. The development contractor activity makes decisions regarding changes to software product baselines (prior to the procurement agency taking formal control of the product baseline). Administration of such changes should be through an internal configuration management organization. Implementation is by project software personnel. Direction for changes to the functional and allocated baselines continue to come from the procurement agency. In addition, changes to the functional, allocated, or production baseline (prior to operational support) are implemented by the development contractor activity. Interfaces among participating contractors must be established to maintain proper configuration control of the developmental products.

3.3.2.4. The operational support activity assumes the responsibility to implement any change requests from the development contractor. Frequently, some level of configuration control is accomplished by the support activity prior to that to ease the transition. Decisions for making changes once in operational use are shared among the using command, supporting command/activities, any interservice commands as appropriate, and support contractors as appropriate. The CRLCMP is the primary planning document for the operational support activity software configuration management. In addition, using/supporting command/activities and subordinate agency regulations may exist.

3.3.3. **Software Status Accounting:**

3.3.3.1. Status accounting is evaluated for how well the changes to software baselines are tracked and reported, the capability of automated tools to support the tracking, and the effectiveness of interfaces for communicating status accounting information among organizational elements. Software configuration management uses status accounting to enhance software supportability to the extent that configuration identification and changes to the configured items are tracked and reported through a configuration index and change status reports.

3.3.3.2. The procurement activity is responsible for monitoring the status of the baseline development. Status accounting provides the procurement activity with visibility and traceability of baseline configurations and their changes. The program office configuration management organization uses status accounting reports to maintain official baselines and to perform the system configuration control board function.

3.3.3.3. The development contractor activity uses status accounting information (configuration index and change reports) for internal management visibility and traceability and or external government reporting requirements.

3.3.3.4. The operational support activity uses status accounting information for coordination of software maintenance tasks that may involve many organizations in widely scattered locations as well as for usual internal management visibility and implementation change status. The CRLCMP is the primary operational support software configuration management planning document.

3.3.4. **Software Configuration Audit/Review:**

3.3.4.1. Software configuration audit/review is evaluated for adherence to regulations and standards (such as MIL-STD-1521B) and for the planning/conduct/results associated with such audits/reviews. Software configuration management utilizes configuration audits/reviews to enhance software supportability to

the extent that the functional and physical configuration of the software baselines have contract requirements.

3.3.4.2. The procurement activity is responsible for preparation and approval of the formal audits and reviews: functional configuration audit, physical configuration audit, and formal qualification review.

3.3.4.3. The development contractor activity is responsible for preparation of and conducting or assisting with formal configuration audits and reviews. In addition, internal configuration audits should be periodically done on developmental baselines to provide assurance that configuration identification, control, and status accounting functions are being properly administered and the resulting configuration information is consistent.

3.3.4.4. The operational support activity is responsible for monitoring the formal audits and reviews prior to operational support and for preparation and conduct of updated baseline configuration audits and reviews after operational support. The CRLCMP is the primary operational support activity software configuration management planning document.

4. Software Support Life Cycle Process Evaluation Procedure. The software support life cycle process evaluation procedure is an ongoing effort throughout AFOTEC's involvement with a system containing mission critical computer resources. The particular life cycle process evaluation emphasis by activity and life cycle phase is illustrated in figure 2. The numbers in parentheses are the relative weights of emphasis. The specific aspects of the evaluation are briefly described in the following paragraphs.

4.1. **Planning the Evaluation:**

4.1.1. You must carefully plan for the collection of the required data in order to adequately complete the life cycle process

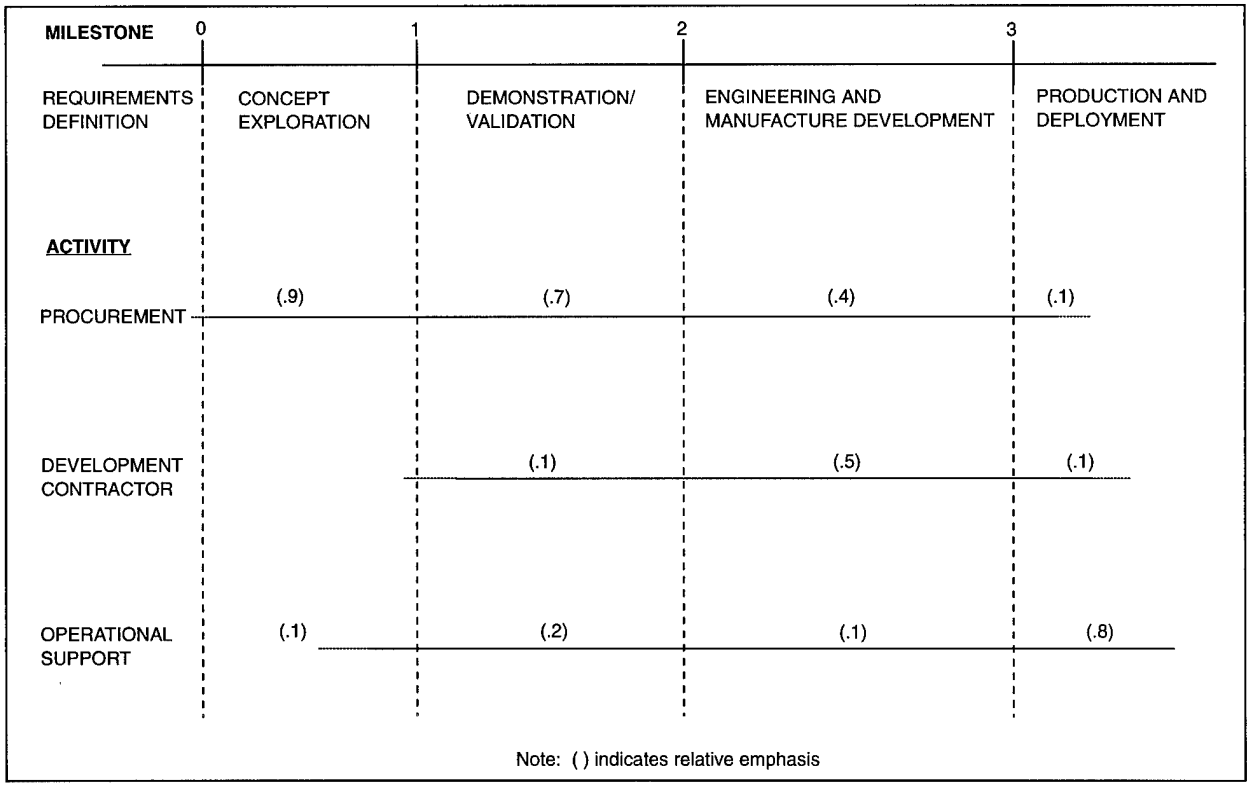


Figure 2. Focus of Software Life Cycle Process by Activity.

evaluation questionnaire. You should review the software support life cycle process questionnaire during AFOTEC's advanced planning and identify likely sources for answers to the questions. A timetable should be developed as part of the evaluation plan which specifies when the identified source documents will be available, program reviews will be held, tests will be conducted, and key personnel can be visited to obtain the information needed to address each question.

4.1.2. Most sources of information will be similar between systems. For the most part, this evaluation guide can serve as a checklist (from advanced planning through OT&E) for AFOTEC concerns about the software life cycle processes that ultimately impact software supportability once a system is fielded.

4.2. **Conducting the Evaluation:**

4.2.1. Conducting the software life cycle process evaluation consists of the formal completion of the questionnaire as you track a system's development and plan for and conduct the OT&E. Space is provided in each question for both the response score and response rationale. Use the rationale portion to provide comments and sources of the information justifying the response. This will assist in (1) writing the report and (2) transitioning the program to another software test manager or deputy for software evaluation. The intent is not to try to complete this evaluation in one sitting but to work through it during your involvement with a program. If you are starting out on a new program, this evaluation guide can be used directly as you begin advanced planning. Use the questions for meeting preparation, as they provide a good source of topics that need to be discussed, and document review. If you are in the middle of a program, previously collected data or historical searches, updated to reflect current software life cycle process status, can be used as a basis for a particular response.

4.2.2 Some questions may not be answerable in a direct manner. In this case, you will have to use your best judgment estimate or leave it unanswered. You will not invalidate the evaluation, but the basis of the upper-level characteristic or test factor to which the unanswered question pertains has a reduced confidence. If an early operational evaluation is being conducted, some areas may have to be addressed at the upper-level characteristic or test factor. Again, this does not constitute an invalid evaluation, but care must be taken in reporting the findings since the confidence level might be quite low.

4.3. **Analyzing Evaluation Results:**

4.3.1. Problems/concerns that you note during any phase of your involvement with a program can be presented in an appropriate forum (such as a system/software requirements review, preliminary design review, engineering design review, or program management review) or staffed through HQ AFOTEC "T" or Systems Analysis Directorates to the implementing agency. Lost opportunities to address concerns/problems (or unresolved concerns/problems) will simply remain as evaluated. Areas that are resolved favorably with regard to the evaluation questions must result in reevaluating that question.

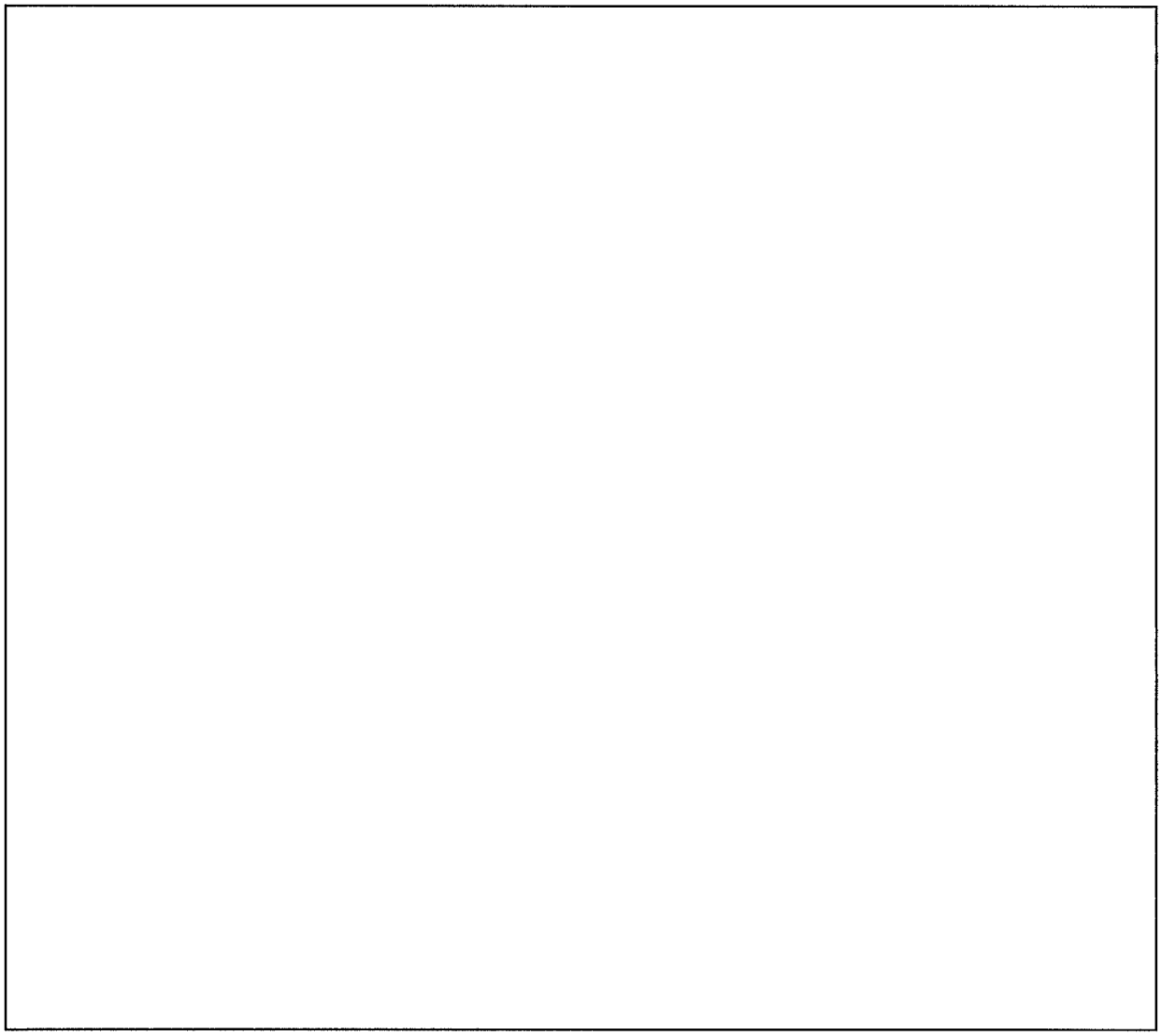
4.3.2. Processing the numerical scores from each question into its upper-level characteristic or test factor can be accomplished in two ways: by inputting the question scores directly into the automated Field Question Analysis System (FQAS) or by marking National Computer System (NCS) general purpose answer sheets (described below) for computing the characteristic or test factor averages. Copies of FQAS are available from AFOTEC/SAS.

5. Response Form:

5.1.1. The name block is shown in figure 3. Only your name needs to be put here. The SEX and GRADE or EDUC blocks are not used.

5.1.2. The numerical identification block is shown in figure 4. Each assigned column has special meaning, so use extreme care in entering the data. Integer values represent specific characteristics or test factors as shown in figure 4.

5.1.3. The question response block is shown in figure 5. The response number corresponds to the question number for the characteristic or test factor being addressed.



(Note: The "SEX" block and "GRADE" or "EDUC" blocks need not be filled in.)

Figure 3. Evaluator Name Block Example.

5.2. This form is processed through an optical scanner, so it is important that the appropriate circles be darkly marked and no extraneous marks appear. Errors must be completely erased!

6. Response Scale:

6.1. To complete the evaluation questionnaire within this volume, you will use the subjective scale of agreement from 6 (completely agree) to 1 (completely disagree). In general, the response scale should be interpreted as follows:

(A) COMPLETELY AGREE (6): There must be absolutely no doubt when using this response that the characteristic being evaluated is totally satisfactory with respect to the characteristic addressed.

(B) STRONGLY AGREE (5): This response indicates that the characteristic being evaluated is very good and is very helpful for software supportability.

(C) GENERALLY AGREE (4): This response indicates that the characteristic being evaluated is satisfactory but may require improve-

Columns	Description	Range
Birthdate	Date Evaluation Started	
- Month (MO)		Jan - Dec
- Day		01-31
- Year (YR)		00-99
Identification Number		
- A	Major Characteristic	5 = Project Management 6 = Configuration Management
- B	Lower Level Characteristic	1 (PM - Planning, CM - Identification) 2 (PM - Org Structure, CM - Control) 3 (PM - Design Methods, CM - Status Accounting) 4 (PM - Implementation Methods, CM - Review/Audit) 5 (PM - Test Strategies) 6 (PM - Project Interfaces)
- C,D	System Level Code (Level 1)	01-99
- E,F	Subsystem Code (Level 2)	01-99
- G,H,I	Evaluator Code	001-999 (Use only if more than one person is performing the evaluation)
Special Codes (Leave Blank)		

Figure 4. Numerical Identification Block Format and Example.

ments to make it helpful for software supportability.

(D) GENERALLY DISAGREE (3): This response indicates that the characteristic being evaluated is unsatisfactory and some improvements are required to make it helpful for software supportability.

(E) STRONGLY DISAGREE (2): This response indicates that the characteristic being evaluated is unsatisfactory and major improvements are required before it would be helpful for software supportability.

(F) COMPLETELY DISAGREE (1): There must be absolutely no doubt when using this response that the characteristic being evaluated is totally unsatisfactory with respect to the characteristic addressed.

(H) NOT ANSWERED (n/a): This response indicates that the characteristic being evaluated is not answerable at this time or is being deliberately bypassed.

One of these responses should be given for each question. Also, response 1 or 6 is, in general, not expected, since these responses indicate a worst possible or best possible characteristic relative to software file cycle processes in general.

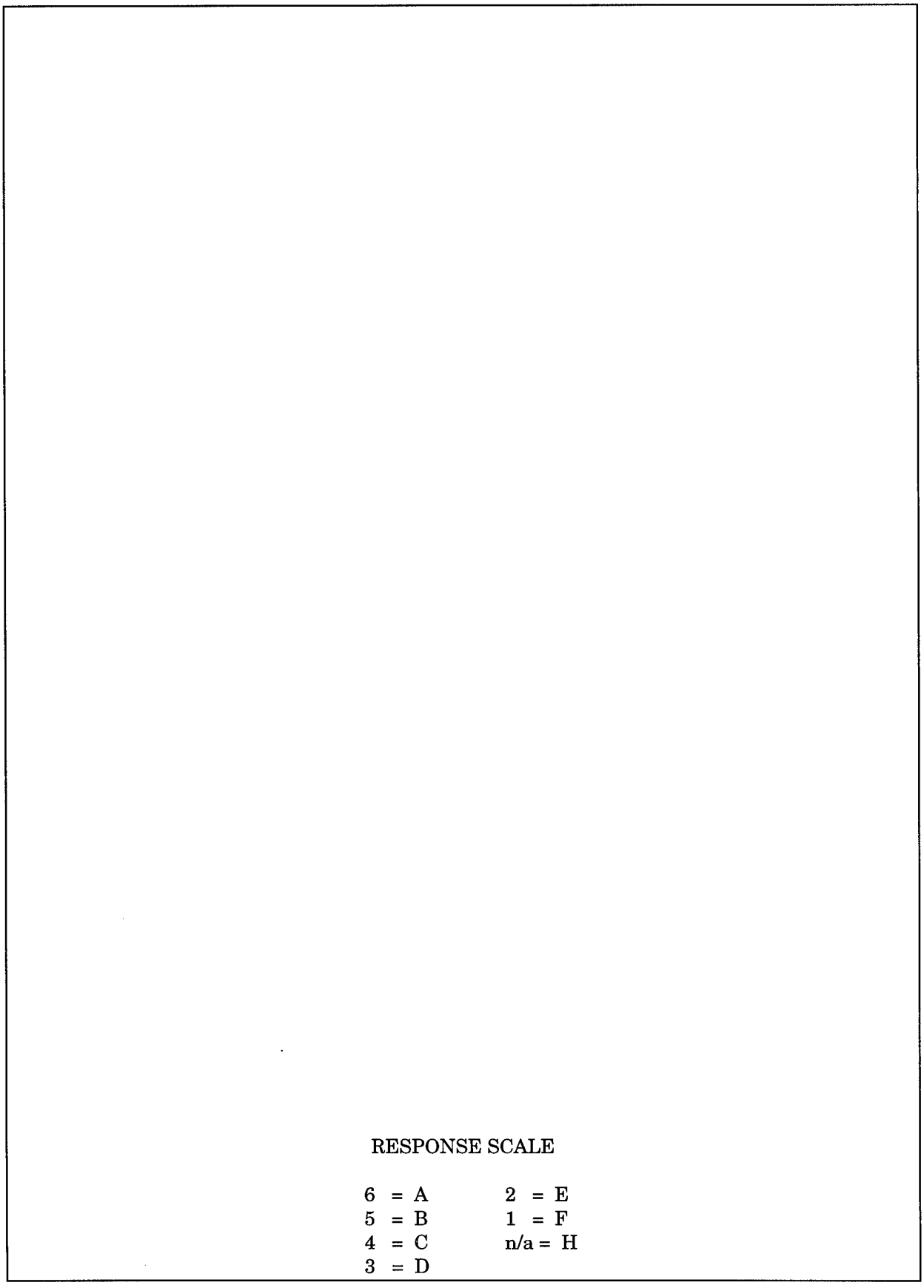


Figure 5. Question Response Forward Block.

Directives, Regulations, Standards

1. DoDD 5000.1, Major System Acquisition, 23 February 1991.

2. DoDD 5000.2, Major System Acquisition Procedures, 23 February 1991.

3. DoDD 3405.1, Computer Programming Language Policy, 2 April 1987.

4. AFR 55-43, Management of Operational Test and Evaluation, 28 June 1985 (to be published as AFI 99-102).

5. AFR 80-14, Test and Evaluation, 3 November 1986 (to be published as AFI 99-101).

6. AFR 800-8, Integrated Logistics Support (ILS) Program, 25 June 1986.

7. AFR 800-14, Lifecycle Management of Computer Resources in Systems, 29 September 1986 (in revision).

8. AFP 800-48, Software Management Indicators, June 1992.

9. DoD-STD-2167A, Defense System Software Development, 29 February 1988, and associated Data Item Descriptions.

10. DoD-STD-2168, Software Quality Evaluation, 29 April 1988, and associated Data Item Description.

11. DoD-HDBK-287M Defense System Software Development Handbook, 23 May 1986.

12. DoD-STD-480A, Configuration Control - Engineering Changes, Deviations, and Waivers, 12 April 1978.

13. MIL-STD-482A, Configuration Status Accounting Data Elements and Related Features, 1 April 1974.

14. MIL-STD-483A, Configuration Management Practices for Systems, Equipment, Munitions, and Computer Programs, 4 June 1985.

15. MIL-STD-490A, Specification Practices, 4 June 1985.

16. MIL-STD-1521B, Technical Reviews and Audits for Systems, Equipment, and Computer Software, 4 June 1985.

17. AFOTEC Instruction 99-101, Management of Operational Test and Evaluation, 1 October 1993.

Figure 6. Information Sources for Software Support Life Cycle Process Evaluation.

Project Specific Documents

1. Operational Requirements Document (ORD).
2. Program Management Directive (PMD).
3. Program Management Plan (PMP).
4. Test and Evaluation Master Plan (TEMP).
5. Request for Proposal (RFP), including the Statement of Work (SOW) and the Contract Requirement Data List (CDRL).
6. Computer Resources Life Cycle Management Plan (CRLCMP).
7. Development Test and Evaluation Plans.
8. Operational Test and Evaluation Plans.
9. Contractor Computer Program Development Plan (CPDP) or Software Development Plan (SDP).
10. Contractor Software Configuration Management Plan (SCMP).
11. Contractor Software Quality Program Plan (SQPP).
12. Contractor Software Standards and Procedures Manual (SSPM).
13. Computer Support Integrated Support Document (CRISD).

Figure 6. Continued.

6.2. Note that the correspondence with the letters on the NCS answer sheet (figure 5) is as follows in case that answer sheet is used to consolidate the question responses:

6 = A
5 = B
4 = C
3 = D
2 = E
1 = F
n/a = H

7. Evaluation Information Sources. The sources of information to determine a response to a question can be categorized in many ways. One convenient categorization is:

7.1. **Project Documents.** Government, contractor.

7.2. **Regulations, Directives, Guidelines.** Compliance, internal.

7.3. **Personnel.** Procurement, development contractor, operational support, interface working groups.

The primary information sources across these categories are listed in figure 6. The terminology for some of the questions is based on the DoD-STD-2167A, Military Standard for Defense System Software Development.

8. Summary of Evaluation Philosophy. The following is a general philosophy which should guide you in answering the Software Support Life Cycle Process questions.

8.1. To begin with, you will notice that the "questions" are really statements describing a

particularly desirable attribute of software project management or software configuration management. In answering the question, you will have to quantify your qualitative viewpoint as to what degree that desirable attribute is reflected in the system under evaluation. The average of the answers of each set of questions for a characteristic then provides the basis for an evaluation of the contribution of that characteristic to the software support life cycle process and to the supportability of the system software.

8.2. The intent of this evaluation is *not* that it is completed in one sitting or even over a week's effort. The idea is that this evaluation is a running history of the processes that affect both the quality of the software products and the quality of the support resources needed to support that product. Properly done, this evaluation will be ongoing throughout our involvement of a system's develop ment and test. There is plenty of room on each page to write comments on your findings and/or thoughts about the area being addressed.

8.3. Your answer to a question may represent the consensus of a group of personnel familiar with the characteristic being addressed by the question, a response from one system expert, or your response derived from data collected from system personnel and documentation.

8.4. You should establish contacts with knowledgeable personnel in the procurement activity, development contractor activity, and the operational support activity in order to identify and collect information which would assist you in answering the questions. In most Air Force programs, the procurement activity will be from one of the product centers of Air Force Materiel Command, while the operational support activity will be one of the logistics centers.

8.5. It may be difficult to answer all questions. You should make every attempt to obtain enough information related to each question to make a reasonable response. However, you should not respond to any question without reasonable rationale.

8.6. The bottom line of this evaluation is "To what extent the software support life cycle process--in particular, software project management and software configuration--contributes to the supportability of the system software?" Each characteristic evaluated should be considered in the context of this question.

9. How to Recommend Changes. This guide is not a perfect test tool; we will change it as needed. One of the best sources for additional information to be included or areas that should be revised is you, the one who uses this evaluation guide. The last page of this pamphlet contains a blank Question Data Sheet you can use to recommend changes. The Question Data Sheet may be used to address exact questions (fill in the question number) or to suggest new questions. Send the question data sheet along with any additional information to:

HQ AFOTEC/SAS
8500 Gibson Blvd SE
Kirtland AFB NM 87117-5558

Please identify yourself and the circumstances which led to your recommendation, and someone from the Software Analysis Team will contact you and discuss the recommendation with you.

GEORGE B. HARRISON, Major General, USAF
Commander

4 Attachments

1. Software Support Life Cycle Process Question Response Guidelines
2. Summary List of Questions
3. Questions Number List by Time Phase
4. Glossary

SOFTWARE SUPPORT LIFE CYCLE PROCESS

QUESTION RESPONSE GUIDELINES

The Software Life Cycle Process Questions and Response Guidelines are presented in this attachment. The information for each question is presented on one page and consists of:

a. Statement of the evaluation question.

b. Characteristic identification.

c. Applicable activity.

d. Explanation of the question as appropriate.

e. Glossary of terms as appropriate.

f. Special response instructions (if any).

g. Response rationale to be completed by the evaluator.

h. Response score to be completed by the evaluator (range is 6 to 1).

The question identification information is at the top right of each page. For example, "SCM(ID) - 001" is question number 001 for the characteristic Identification (ID) within the major factor Software Configuration Management (SCM). In addition, each set of characteristic questions (e.g., for Identification) is preceded by a one-page description of the characteristic features.

The Software Project Management and Software Configuration Management Guidelines are presented in that order.

ABBREVIATIONS AND ACRONYMS

The following list of abbreviations and acronyms is frequently used in the questions.

CCB	configuration control board
CDR	critical design review
CDRL	contract data requirements list
CRISD	computer resources integrated support document
CRLCMP	computer resources life cycle management plan
CRWG	computer resources working group
CSC	computer software component
CSCI	computer software configuration item
DID	data item description
DT&E	development test and evaluation
ECP	engineering change proposal
FCA	functional configuration audit
FOT&E	follow-on operational test and evaluation
FQT	formal qualification test
HIPO	hierarchy, input, process, output
HOL	high order language
HWCI	hardware configuration item
ICWG	interface control working group
IOT&E	initial operational test and evaluation
ISA	instruction set architecture
IV&V	independent verification and validation
ORD	operations requirements document
PCA	physical configuration audit
PDR	preliminary design review
PDSS	postdeployment software support
PID	prime item development (specification)
PMD	program management directive
PMP	program management plan
PQT	preliminary qualification test
RFP	request for proposal
SCM	software configuration management
SCMP	software configuration management plan
SCN	specification change notice
SDP	software development plan
SDR	system design review
SOW	statement of work
SPM	software project management
SQPP	software quality program plan
SRR	system requirements review
SSPM	software standards and procedures manual
STP	software test plan
TEMP	test and evaluation master plan
TPWG	test planning working group
TRR	test readiness review
WBS	work breakdown structure

SOFTWARE PROJECT MANAGEMENT PLANNING

The questions SPM(PL)-001 through SPM(PL)-032 address adequacy of software project management planning for the procurement, development contractor, and operational support activities. Project management planning is established in the form of technical documentation that becomes more detailed as development proceeds and more refined as the final development products are evolved during postdeployment support. Three levels of project planning are generally employed during the software system's life cycle:

(1) Procurement activity project planning.
(2) Development contractor activity project planning.
(3) Operational support activity project planning.

The procurement activity project plans include:

(1) Program Management Plan (PMP).
(2) Test and Evaluation Master Plan (TEMP).
(3) RFP/SOW/CDRL package.
(4) DT&E Plans.
(5) OT&E Plans.
(6) Computer Resources Life Cycle Management Plan (CRLCMP).

The development contractor activity project plans include:

(1) Software Development Plan (SDP).
(2) Software Configuration Management Plan (SCMP).
(3) Software Quality Program Plan (SQPP).
(4) Software Standards and Procedures Manual (SSPM).
(5) Software test planning. (Plan, Procedures, Description, Acceptance).
(6) Computer Resources Integrated Support Document (CRISD).

The operational support activity project plans include:

(1) CRLCMP.
(2) Software Configuration Management Plan (SCMP).
(3) Software Support Management Plan (SSMP).
(4) Other agreements (e.g., Memorandums of Agreement).

The adequacy of software project management planning with respect to the area of software supportability is mostly a matter of early identification of software supportability characteristics in planning documents, procurement requiring software supportability characteristics, development contractor implementing the characteristics, and operational support transitioning early life cycle concepts and continuing the evolution process through the postdeployment life cycle phase.

QUESTION DATA SHEET

Question Number SPM(PL) - 001

QUESTION: Planning for computer resources has been adequate with respect to acquisition, development, logistics, and training.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The primary procurement planning documents include the PMP, TEMP, System/Segment Specification, and CRLCMP. The computer resources includes the hardware, software, personnel, procedures, facilities, schedule, budget, and so forth. All aspects of acquisition, development, logistics support, and training must be planned. The Milestones I, II, and III provide major event check points for analysis and review of plans. Analysis should always be conducted with respect to operational requirements and the results integrated back into the "living" plans. Plans for measuring software quality attributes, in particular software supportability, are required.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 002

QUESTION: Procurement planning for computer resources has been consistent with the system development and acquisition plan.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The primary system development and acquisition plan is the PMP. The CRLCMP should be derived from the allocation of the system requirements in the PMP to computer resources. The CRLCMP identifies computer resource acquisition and life cycle support requirements. The CRLCMP reflects the software development and support approach for the system and is evolved as a living document throughout the system life cycle.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 003

QUESTION: Planning for computer resources has been based on an acquisition schedule with adequately specified milestones.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The plans should be based on a realistic acquisition schedule. Major Milestones I, II, and III should be specified as well as the major review and audit points such as SDR, SRR, PDR, CDR, TRR, FCA, and PCA. The transition and turnover dates should also realistically reflect the risks in acquiring and supporting such a system. Studies and analysis should have been performed prior to the Engineering and Manufacture Development effort in order to determine what a realistic schedule should be.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 004

QUESTION: Computer resources have been adequately addressed as major considerations at procurement reviews, audits, and management evaluations.

ACTIVITY(IES): All

EXPLANATION: Typical procurement reviews, audits, and management evaluation involve participation of all activities. The degree of participation depends on the particular event. Feasibility studies, tradeoff analysis, prototype developments, and milestone decision points determine how thoroughly computer resources have been addressed.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 005

QUESTION: Planned computer resources have been analyzed adequately by the program office to ensure conformance with stated operational and support requirements.

ACTIVITY(IES): Procurement

EXPLANATION: Methods of analysis include feasibility studies, tradeoff studies, risk analysis, and prototype development. These methods usually occur during Concept Exploration and/or Demonstration and Validation phases prior to the Engineering and Manufacture phase. During Engineering and Manufacture Development, an IV&V function can assist in such analysis.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 006

QUESTION: Procurement planning software quality attributes has been adequately emphasized throughout the software life cycle acquisition.

ACTIVITY(IES): Procurement

EXPLANATION: Software quality attributes should be a major consideration in the initial planning of software requirements. This emphasis should be continued throughout the system and software life cycle phases. Software quality requirements and responsibilities should be defined in the CRLCMP. Procedures should be developed and implemented to ensure proper assessment of computer resources throughout the system life cycle. The procurement activity should develop assessment procedures to ensure that the computer software will meet management policies and appropriate regulations throughout the system life cycle. Computer software should be assessed continuously by means of reviews, audits, verification validation testing, and other enforcement activities.

GLOSSARY:

Software Quality Attributes. Reliability, Supportability, Maturity, Efficiency, and so forth.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 007

QUESTION: Margins for reserve computer resource capacity to provide for later product improvements are adequate.

ACTIVITY(IES): All

EXPLANATION: Requirements for margins and the initial values are established by the procurement and operational support activity in the PMD, RFP/SOW, and System/Segment Specification. These margins are then evolved throughout the Engineering and Manufacture by the development contractor activity. Margins should be established for memory, external storage, task utilization, terminal usage, performance parameters, and so forth. Typical guidelines are to leave 30 to 50 percent of the total resource capacity as reserve dependent upon the resource and the particular application. The margin of reserve is very important for software supportability since changes will usually require consumption of some of the reserve.

GLOSSARY:

Margin. The difference between the total available capacity of a resource and the actual amount used divided by 100.

RESPONSE INSTRUCTIONS:

F/1: 50% or less of required reserve capacity is available for at least one of the resources, or no margin requirements have been established
E/2: 50% to 59% of required reserve capacity is available for at least one of the resources
D/3: 60% to 69% "
C/4: 70% to 79% "
B/5: 80% to 89% "
A/6: 90% to 100% of required reserve capacity is available for all resources

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 008

QUESTION: Acceptable techniques have been used to estimate and monitor software costs throughout the system life cycle.

ACTIVITY(IES): All

EXPLANATION: It is necessary that a standard technique (e.g., COCOMO model) be used to estimate software costs throughout the system life cycle. It is probably more important that some technique be consistently used and the results carefully monitored than which technique is used. Each activity should have some method that is used and a way to correlate cost results from the other activities with their results. A cost/schedule risk analysis should be done at each of the major project life cycle decision points. The software costs are usually related to the related WBS tasks in order to accomplish the cost/schedule risk analysis.

GLOSSARY:

COCOMO. Constructive Cost Model (B. Boehm of TRW)

Software Cost. The resources consumed to develop and support software throughout its life cycle.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 009

QUESTION: The CRLCMP contains adequate specifications of the acquisition requirements for computer resources.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: During the development phase, the CRLCMP serves to define the development plan and to identify the computer resources necessary to support the system after deployment. After managing the support of the system's computer resources, the procurement activity should begin preparing the CRLCMP with the help of the operational support activity, with completion no later than Milestone II or equivalent. At this point, the CRLCMP should focus on plans for developing the computer resources, including computer resources needed for system support. As the system progresses into the Engineering and Manufacture phase, the CRLCMP should be expanded to provide a comprehensive plan for support of computer resources. By Milestone III or equivalent, the CRLCMP should contain a plan for transitioning computer resource responsibilities from the procurement activity to the operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 010

QUESTION: The CRLCMP adequately addresses the responsibilities and procedures to ensure proper software configuration management throughout the system life cycle.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: Responsibilities should be defined in the CRLCMP, and procedures should be developed and implemented to ensure proper control of computer resources throughout the system life cycle. Computer hardware and software should be identified, specified, and managed as configuration item. The mechanism for controlling computer hardware and software changes is the documentation for each configuration item, and it is the responsibility of the system configuration manager within the procurement or operational support activity to ensure that this documentation is accurate and current. The Configuration Control Board (CCB) should be the primary authority for approving hardware and software changes to the existing baseline. The CCB membership should be determined by the procurement and/or the operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 011

QUESTION: The project management responsibility for integrating computer resources into a system has remained centralized throughout the life of the system.

ACTIVITY(IES): All

EXPLANATION: The minimum requirement is that each activity's project management responsibility remain with the same organizational element. For example, the implementing command (product/logistics centers), development contractor, and using command remain the same. A more important aspect of this centralization is that the lower level organizational structure (including personnel) within each activity should remain intact without fragmentation or major variance of responsibility over all life cycle phases.

GLOSSARY:

Centralized. Located within the same organizational element.

RESPONSE INSTRUCTIONS:

F/1: Under 50% of the project management across all activities and all phases has remained centralized

E/2:	50% to 59%	"
D/3:	60% to 69%	"
C/4:	70% to 79%	"
B/5:	80% to 89%	"
A/6:	90% to 100%	"

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 012

QUESTION: The CRWG organization has been adequate throughout the system life cycle.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: If not already established during the Concept Exploration phase, the CRWG should be formed early in the Demonstration and Validation phase to assist the program manager in planning and implementing software issues, activities, and functions. During acquisition, the implementing command chairs and manages the CRWG. The CRWG should also include the using command, supporting logistics centers, and perhaps representatives of other organizations responsible for DT&E, OT&E, and training.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 013

QUESTION: The CRWG has had clearly specified responsibilities and appropriate authority to implement those responsibilities throughout the system life cycle.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The CRWG supports the program manager in developing the CRLCMP. Also, the CRWG recommends alternatives in areas such as documentation requirements, software security requirements, IV&V, standard equipment, standard HOLs, standard ISAs, and margins for reserve computer capacity. The CRWG identifies the computer resources and facilities required to support the system throughout the system life cycle. For programs with interservicing potential, the CRWG includes members from each organization affected by interservicing. The CRWG analyzes interservicing potential to support the program manager's decision concerning a joint service facility. This analysis should consider operational needs, life cycle costs, technical capability, and service-unique standards for computer resources. Without the proper authority to implement its decisions and have its recommendations acted upon, the CRWG will be deficient.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 014

QUESTION: The CRWG has properly ensured that computer resources comply with established policy, procedures, plans, and standards.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The CRWG assists in ensuring that computer resources comply with established policy, procedures, plans, and standards. The CRWG continuously supports the procurement activity in planning the computer resource life cycle and evaluating developed computer resources. The CRWG recommends updates to the CRLCMP to ensure that acquisition, user, and support requirements are satisfied. The CRWG evaluates computer software plans, products, and proposed changes to ensure compatibility with the CRLCMP and consistency with policies and procedures. The CRWG also supports the procurement activity in the resolution of issues such as documentation requirements and support agreements. If computer resources development is part of an interservice program, then the interservice CRWG verifies that the required computer resources and operational support capabilities are available to support the system. Before Milestone III or equivalent, the CRWG should develop interservice procedures for operational support of the system. In addition, the CRWG ensures that the joint service operational support activity participates in the Engineering and Manufacture Development phase, thereby acquiring the necessary familiarity and experience to support the system on completion of development.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 015

QUESTION: Software quality assessment procedures have been adequately defined to meet management policies and appropriate regulations, conform to standards, and meet performance and quality requirements throughout the system life cycle.

ACTIVITY(IES): All

EXPLANATION: Software quality requirements and responsibilities shall be defined in the CRLCMP. Procedures should be developed and implemented to ensure proper assessment of computer resources throughout the system life cycle. The procurement activity develops assessment procedures to ensure that the computer software will meet management policies and appropriate regulations, conform to standards, and meet performance and quality requirements throughout the system life cycle. Computer software should be assessed continuously by means of reviews, audits, verification validation testing, and other enforcement activities. The primary software quality standard is DoD-STD-2168.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 016

QUESTION: Planning for DT&E of computer resources has been adequate throughout the system life cycle.

ACTIVITY(IES): Procurement

EXPLANATION: The primary high-level planning document for DT&E is the TEMP. DT&E descriptions in the TEMP should concentrate on technical goals, thresholds, and objectives. At each review phase, the essential questions should continue to be whether objectives were met, degree of confidence in results, and specific system behavior leading to observed anomalies. The detailed DT&E plans supplement the TEMP and provide insight into the specific software and system integration tests and procedures that are planned.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 017

QUESTION: Planning for OT&E of computer resources has been adequate throughout the system life cycle.

ACTIVITY(IES): Procurement

EXPLANATION: The primary high-level planning document for OT&E is the TEMP. More detailed OT&E plans supplement the TEMP. The types of OT&E are IOT&E and FOT&E. IOT&E is the first test of a complete system and support elements in an operational environment. IOT&E provides an early over-the-shoulder effort during the Demonstration and Validation phase of the system life cycle. The purpose of the early IOT&E is to provide an operational input to the initial development program, ensure the coupling of requirements to the development program, develop an interface between developer and user, and refine for Engineering and Manufacture Development; a later IOT&E is conducted prior to the production decision. FOT&E is conducted when the system is fully deployed in order to assess full system capability. Specific objectives, measures of effectiveness, and measures of performance should be addressed in the OT&E planning documents.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 018

QUESTION: Software standards have been adequately specified throughout the software life cycle.

ACTIVITY(IES): All

EXPLANATION: The RFP/CDRL/SOW reflects required software standards as specified by the procurement activity. The standards should apply to all aspects of the software development and support. Typical standards are DoD-STD-2167A, DoD-STD-2168, MIL-STD-483A, MIL-STD-1521B, DoD-STD-1815A, and various ANSI/IEEE software engineering standards. The development contractor must comply with the procurement requirements through internal standards and conventions. The operational support activity contributes to the recommendations on the use of required standards and sets internal standards and conventions for use during the postdeployment support of the software.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 019

QUESTION: The planning for organic and/or contractor support during postdeployment software support has been adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: Software supportability characteristics include software product maintainability, software support resources, and software life cycle processes. Plans for organic and/or contractor support and the evaluation of whether such support will be adequate relative to software supportability characteristics should be contained in the CRLCMP.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 020

QUESTION: Contractual documents have explicitly established government rights to all computer resources required to develop, operate, simulate, test, and support the software.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: Contractual documents should clearly establish government rights to all computer resources required to support the software. The rights may have proprietary clauses that must be carefully understood by all parties. The application software, system software, and test software should be considered.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 021

QUESTION: Planning for risk analysis to identify areas of computer resource risk has been adequate.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: A common source of operational software problems is the difficulty of maintaining and supporting the software once it is deployed. The technology used to design and implement the software may significantly affect its ability. Danger signals may include the use of proprietary tools and techniques that will not be available to engineers after system delivery. Alternatively, there may be unique aspects of the design effort that positively affect subsequent life cycle cost and effort. One approach to reducing long-term life cycle risks is to enforce the use of common technology throughout the development and operation of the software. It is not uncommon for the project office to supply tools and support software to the development contractor to ensure commonality. However, care should be exercised to avoid government liability in cases of inadequate government-furnished tools. Ideally, life cycle characteristics of operational significance should be listed as required characteristics of the system, and tests should be planned to address the issues that arise from these characteristics.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 022

QUESTION: A mission/function matrix (or equivalent) clearly identifies primary functional capabilities to be implemented by the software.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: A mission/function matrix (or equivalent narrative) is the primary source of information about how the system capabilities have been partitioned between hardware and software. These partitions will be important in determining required characteristics, in defining error/failure criteria, and in isolating and correcting deficiencies noted during testing. Therefore, it may be important to determine that proper engineering studies have led to the establishment of these partitions. An understanding of the sources of risk in each of the software-implemented functions identified in the mission/function matrix is an essential part of the overall risk assessment.

GLOSSARY:

Mission/Function Matrix. Correspondence relating primary functional capabilities that must be demonstrated by testing to the mission to be performed and the concept of operation.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 023

QUESTION: Planning for interoperability with other systems has been adequately addressed.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: When required, systems must be interoperable with other systems employed by the US and Allied military forces. Interoperability requirements should be identified, defined, validated, and included in appropriate planning documentation prior to the end of the Demonstration and Validation phase. Both development and postdeployment support concerns should be addressed and organizational responsibilities defined.

GLOSSARY:

RESPONSE INSTRUCTIONS:
A/6: No interoperability requirements exist for the subject system

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 024

QUESTION: Prior to each system milestone, interservicing potential and life cycle cost implications of software support options have been appropriately addressed.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: Before each system milestone, interservicing potential should be reviewed and the management and life cycle cost implications of major software support options should be analyzed. This analysis should also consider impact on operational needs, configuration management, and system integration. For interservice systems, the CRWG should be an interservice CRWG that includes representatives from all cognizant organizational elements. The CRWG (interservice or single service) should ensure that analysis is performed to determine the optimum support approach, document this analysis, and make recommendations to the procurement activity concerning the support approach.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 025

QUESTION: The procurement and operational support planning documents have been adequately updated as living documents throughout the system life cycle.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: Some of the documents that should be continually updated include the TEMP, CRLCMP, and the DT&E and OT&E plans. It is important that these documents are working plans and as such track closely the progress and current status of the system.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 026

QUESTION: The principles and methodologies provided in the regulations have been appropriately incorporated into the software test and evaluation plans.

ACTIVITY(IES): All

EXPLANATION: Typical procurement and operational support regulations include DoD 5000.2, AFR 800-14, AFR 80-14, and AFR 55-43. Typical development contractor compliance regulations include DoD-STD-2167A, DoD-STD-2168, and MIL-STD-1521B. The software test and evaluation plans are primarily contained in the TEMP, DT&E plans, OT&E plans, IV&V plans, and development contractor plans.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 027

QUESTION: Planning for systematic, quantitative, and objectively reportable software tests has been adequate.

ACTIVITY(IES): All

EXPLANATION: It should be apparent from the description of the software tests conducted and their results whether or not previous goals have been met and test objectives have been satisfied. Vague references to "successful software results" or "no problems with the software" should not be acceptable. In order to evaluate the progress of software testing to date, there must be explicit reference to (1) a systematic, scientifically sound approach to carrying out the test, (2) the relationship between the systematic test approach and the test objectives for the current phase, (3) the results of the test, and (4) the plans for resolution of errors.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 028

QUESTION: Planning for sharing of software test results across life cycle phases and among test organizations has been adequate.

ACTIVITY(IES): All

EXPLANATION: Successful test and evaluation requires involvement and data sharing across all life cycle phases for test organizations: DT&E, OT&E, IV&V, and the development contractor. The TEMP is the primary high-level planning document for software test and evaluation with appropriate references to all the organizational elements' plans. The development contractor activity is responsible for developing test plans and procedures to effect an appropriate sharing (as defined contractually in the SOW) of test results.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 029

QUESTION: Tracking of computer resource utilization has been adequately planned.

ACTIVITY(IES): All

EXPLANATION: The procurement activity must plan to have tracking data collected. This plan is put into action through appropriate contract requirements. The development contractor must plan to implement data collection procedures that satisfy the contractual requirements as a minimum. Normally, more detailed data must be collected by the development contractor in order to properly derive the required contract data and adequately manage the development effort. Typical data to be collected include memory, central processing unit usage, and input/output throughput. The maximum and minimum values and actual resource utilization data values are required. These data are necessary to determine if required margins of reserve will be met. See AFP 800-48 for more information.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 030

QUESTION: The project software budget/cost variance (budgeted - actual) appears to be reasonable.

ACTIVITY(IES): All

EXPLANATION: Depending on the perspective, all activities are required to adequately manage the software budget/cost. At each major management review for the activity, the variance between what was budgeted and what has actually been consumed should be analyzed. Based on the known contractual changes in requirements, an assessment should be made whether the variance in cost is within certain limits. The limits should probably be established during the Demonstration and Validation phase through a risk analysis. See AFP 800-48 for more information.

GLOSSARY:

Budget/Cost Variance. The budgeted cost of software task work (WBS) performed minus the actual cost of software task work performed.

Percentage Variance. The Budget/Cost Variance divided by the actual cost of software task work performed times 100.

RESPONSE INSTRUCTIONS:

F/1: plus or minus 25% or more Percentage Variance
E/2: plus or minus 20% to 25% Percentage Variance
D/3: plus or minus 15% or 20% Percentage Variance
C/4: plus or minus 10% or 15% Percentage Variance
B/5: plus or minus 5% or 10% Percentage Variance
A/6: plus or minus 0% or 5% Percentage Variance

Underruns can be as big an indicator of a problem as an overrun, but each case should be carefully considered on its own merits.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 031

QUESTION: The project software schedule/cost variance (consumed - scheduled) appears to be reasonable.

ACTIVITY(IES): All

EXPLANATION: Depending on the perspective, all activities are required to adequately manage the software schedule/cost. At each major management review for the activity, the variance between what was consumed and what has actually been scheduled should be analyzed. Based on the known contractual changes in requirements, an assessment should be made whether the variance in cost is within certain limits. The limits should probably be established during the Demonstration and Validation phase through a risk analysis. See AFP 800-48 for more information.

GLOSSARY:

Schedule/Cost Variance. The budgeted cost of software task work (WBS) performed minus the budget cost of software task work scheduled.

Percentage Variance. The Schedule/Cost Variance divided by the actual cost of software task work performed times 100.

RESPONSE INSTRUCTIONS:

F/1: plus or minus 25% or more Percentage Variance
E/2: plus or minus 20% to 25% Percentage Variance
D/3: plus or minus 15% or 20% Percentage Variance
C/4: plus or minus 10% or 15% Percentage Variance
B/5: plus or minus 5% or 10% Percentage Variance
A/6: plus or minus 0% or 5% Percentage Variance

Schedule decreases can be as big an indicator of a problem as an increases, but each case should be carefully considered on its own merits.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PL) - 032

QUESTION: The cost and schedule contractual reporting requirements appear to be adequate.

ACTIVITY(IES): All

EXPLANATION: The data necessary to determine the cost variance and schedule variance information in questions SPM(PL)-30 and SPM(PL)-031 are a minimum requirement. DoDI 7000.2 is the policy for financial management reporting for the development contractor activity (appropriate size and types of contracts). AFSCP 173-5 implements the policy of DoDI 7000.2 and provides specific criteria for the development contractor activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE PROJECT MANAGEMENT ORGANIZATION STRUCTURE

The questions SPM(OS)-001 through SPM(OS)-019 address adequacy of software project management organization structure for the procurement, development contractor, and operational support activities. Project management organization structure is established so that the functional requirements of a project can be more effectively accomplished. This organization structure includes the physical relationship among the organization elements, the logical structure that relates the organization elements to the project's functional requirements, and the stability and capability of the personnel who staff the organization.

Characteristics that affect the organization structure are number of internal interfaces, size of organization, stability of the physical structure, continuity and capability of project personnel, and capability of the physical organization to effectively handle responsibilities inherent in the software project work breakdown structure tasks.

QUESTION DATA SHEET

Question Number SPM(OS) - 001

QUESTION: The software requirements have been adequately allocated to elements of a Work Breakdown Structure (WBS).

ACTIVITY(IES): All

EXPLANATION: The WBS should clearly indicate those task areas where software related requirements are addressed. A traceability matrix should clearly indicate how those requirements have been mapped to the WBS elements. All activities (procurement, development contractor, operational support) are involved in some aspect of the WBS, software requirements, and the allocation process.

GLOSSARY:

Software Requirements. Contractual system requirements that have been allocated to software functions. These are usually found in a system/segment specification and/or a functional development specification.

Work Breakdown Structure. Product-oriented hierarchical definition of all tasks to be performed and accounted for in the course of the project development.

RESPONSE INSTRUCTIONS:

F/1: No WBS exists, no software requirements specification exists, and/or there is no evidence of an allocation of software requirements to WBS elements.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 002

QUESTION: The software related tasks are clearly identified in the WBS.

ACTIVITY(IES): All

EXPLANATION: Typical software tasks include project management, development, documentation, test, environment evolution, configuration management, quality assurance, acceptance, and transfer. All software-related tasks should be separately identified from hardware-related tasks as much as is possible. The more accurately such tasks can be tracked and reported, the more likely early problem areas can be identified and resolved.

GLOSSARY:

Software Task. Project task whose primary function is related to the production and/or delivery of a software product.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 003

QUESTION: The key project personnel and their assignments in relation to the WBS software-related tasks are clearly identified.

ACTIVITY(IES): All

EXPLANATION: In order to properly identify responsibilities and communication channels, it is necessary to have the key project personnel for all activities identified along with their areas of responsibility and their relationship to the WBS.

GLOSSARY:

Key Project Personnel. Project managers, task managers, task technical leaders for all activities.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 004

QUESTION: The coordination of modifications to the WBS among all activities has been adequate.

ACTIVITY(IES): All

EXPLANATION: Whenever the WBS is modified, there is potential to have a significant effect on all activities. This effect may be in the form of a modification in schedule, level of effort, deliverable product, functional capability, and/or system interface. A mechanism to coordinate such changes is necessary in order to make sure all potentially affected parties are properly consulted. Without such a mechanism, changes can be made without such consultation or perhaps without being properly reflected in the WBS.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 005

QUESTION: The procurement personnel staffing has had continuity throughout the software life cycle phases.

ACTIVITY(IES): Procurement

EXPLANATION: The staffing continuity is determined by the rate of turnover of personnel during and across the life cycle phases. If the same personnel (or at least a reasonable ration of the same personnel) are not available from phase to phase, then there is likely to be a perturbation in the schedule, cost, functional requirements, and quality of the deliverable products. Turnover of key personnel should be minimal with no sharp variations. See AFP 800-48 for more information.

GLOSSARY:

Continuity. Lack of turnover and sharp change in personnel staff.

RESPONSE INSTRUCTIONS:

F/1: 50% or more turnover during or between any one phase: (Concept, Demonstration, Development, Deployment)
E/2: 40% to 50% turnover during or between any one phase
D/3: 30% to 40% turnover during or between any one phase
C/4: 20% to 30% turnover during or between any one phase
B/5: 10% to 20% turnover during or between any one phase
A/6: 0% to 10% turnover during or between all phases

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 006

QUESTION: The ratio of experienced procurement project personnel to the total number of project personnel has been adequate throughout the software life cycle phases.

ACTIVITY(IES): Procurement

EXPLANATION: One key to developing and supporting software is to have experienced personnel, especially in the key leadership positions. Experience with the subject system, similar systems, technologically similar problems, the management problems of similar systems, and the interfaces with the subject system results in better managed, higher quality software products. Experienced personnel also shorten the learning curve for less experienced personnel. See AFP 800-48 for more information.

GLOSSARY:

Experienced Personnel. Personnel who have an extensive historical perspective of the subject system and its software requirements, as well as the technical expertise and/or management expertise required to efficiently implement the required software solutions.

RESPONSE INSTRUCTIONS:

F/1: 10% or less experienced personnel during any one phase (Concept, Demonstration, Development, Deployment)
E/2: 10% to 20% experienced personnel during any one phase
D/3: 20% to 30% experienced personnel during any one phase
C/4: 30% to 40% experienced personnel during any one phase
B/5: 40% to 50% experienced personnel during any one phase
A/6: 50% or more experienced personnel during any one phase

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 007

QUESTION: The number of procurement personnel has been adequate throughout the software life cycle phases.

ACTIVITY(IES): Procurement

EXPLANATION: The number of personnel should be sufficient to support the responsibilities required by the program. Sufficient number is dependent on matching the experience, workload, and productivity requirements. Typically, fewer persons are required during the concept phase, more persons during the demonstration and then development phases, and gradually fewer persons prior to the deployment phase of the project. One method of determining "sufficient" is to assume the allocated number of personnel is the most optimum, and determine the ratio of actual to allocated personnel. Guidelines for an evaluation response based on this ratio are given below. See AFP 800-48 for more information.

GLOSSARY:

Number of Procurement Personnel. The count of personnel directly responsible for procurement functions relative to the subject system. This includes direct software project management, technical staff, and support staff. Only those staff positions directly allocated, or through direct assignment of an allocated position, should be considered. If necessary, a "full time equivalent" (e.g., part of a position that is shared among one or more other system) value can be used.

RESPONSE INSTRUCTIONS:

F/1: 0% to 50% of allocated load during any life cycle phase (Concept, Demonstration, Development, Deployment)
E/2: 50% to 60% of allocated load during any life cycle phase
D/3: 60% to 70% of allocated load during any life cycle phase
C/4: 70% to 80% of allocated load during any life cycle phase
B/5: 80% to 90% of allocated load during any life cycle phase
A/6: 90% or more of allocated load during all life cycle phase

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 008

QUESTION: The development contractor personnel staffing has had continuity throughout the software life cycle phases.

ACTIVITY(IES): Development Contractor

EXPLANATION: The staffing continuity is determined by the rate of turnover of personnel during and across the life cycle phases. If the same personnel (or at least a reasonable ratio of the same personnel) are not available from phase to phase, then there is likely to be a perturbation in the schedule, cost, functional requirements, and quality of the deliverable products. Turnover of key personnel should be minimal with no sharp variations. See AFP 800-48 for more information.

GLOSSARY:

Continuity. Lack of turnover and sharp change in personnel staff.

RESPONSE INSTRUCTIONS:

F/1: 50% or more turnover during or between any one phase (Concept, Demonstration, Development, Deployment)
E/2: 40% to 50% turnover during or between any one phase
D/3: 30% to 40% turnover during or between any one phase
C/4: 20% to 30% turnover during or between any one phase
B/5: 10% to 20% turnover during or between any one phase
A/6: 0% to 10% turnover during or between all phases

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 009

QUESTION: The ratio of experienced development contractor project personnel to the total number of project personnel has been adequate throughout the software life cycle phases.

ACTIVITY(IES): Development Contractor

EXPLANATION: One key to developing and supporting software is to have experienced personnel, especially in the key leadership positions. Experience with the subject system, similar systems, technologically similar problems, the management problems of similar systems, and the interfaces with the subject system results in better managed, higher quality software products. Experienced personnel also shorten the learning curve for less experienced personnel. See AFP 800-48 for more information.

GLOSSARY:

Experienced Personnel. Personnel who have an extensive historical perspective of the subject system and its software requirements, as well as the technical expertise and/or management expertise required to efficiently implement the required software solutions.

RESPONSE INSTRUCTIONS:

F/1: 10% or less experienced personnel during any one phase (Concept, Demonstration, Development, Deployment)
E/2: 10% to 20% experienced personnel during any one phase
D/3: 20% to 30% experienced personnel during any one phase
C/4: 30% to 40% experienced personnel during any one phase
B/5: 40% to 50% experienced personnel during any one phase
A/6: 50% or more experienced personnel during all phases

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 010

QUESTION: The number of development contractor personnel has been adequate throughout the software life cycle phases.

ACTIVITY(IES): Development Contractor

EXPLANATION: The number of personnel should be sufficient to support the responsibilities required by the program. Sufficient number is dependent on matching the experience, workload, and productivity requirements. Typically, fewer persons are required during the early requirements phase, more persons during the design and implementation phases, and gradually fewer persons prior to the production phase of the project. There are few good guidelines as to what is "sufficient" for a development contractor. The use of cost estimation equations as proposed in the literature (e.g., B. Boehm's COCOMO model) is sharp increases or decreases in the number of personnel do not occur. See AFP 800-48 for more information.

GLOSSARY:

Number of Development Contractor Personnel. The count of personnel directly responsible for development contractor functions relative to the subject system. This includes direct software project management, technical staff, and support staff. Only those staff positions directly assigned should be considered. If necessary, a "full time equivalent" (e.g., part of a position that is shared among one or more other systems) value can be used.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 011

QUESTION: The operational support personnel staffing has had continuity throughout the software life cycle phases.

ACTIVITY(IES): Operational Support

EXPLANATION: The staffing continuity is determined by the rate of turnover of personnel during and across the life cycle phases. If the same personnel (or at least a reasonable ratio of the same personnel) are not available from phase to phase, then there is likely to be a perturbation in the schedule, cost, functional requirements, and quality of the deliverable products. Turnover of key personnel should be minimal with no sharp variations. See AFP 800-48 for more information.

GLOSSARY:

Continuity. Lack of turnover and sharp change in personnel staff.

RESPONSE INSTRUCTIONS:

F/1: 50% or more turnover during or between any one phase (Concept, Demonstration, Development, Deployment)
E/2: 40% to 50% turnover during or between any one phase
D/3: 30% to 40% turnover during or between any one phase
C/4: 20% to 30% turnover during or between any one phase
B/5: 10% to 20% turnover during or between any one phase
A/6: 0% to 10% turnover during or between all phases

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 012

QUESTION: The ratio of experienced operational support project personnel to the total number of project personnel has been adequate throughout the software life cycle phases.

ACTIVITY(IES): Operational Support

EXPLANATION: One key to supporting software is to have experienced personnel, especially in the key leadership positions. Experience with the subject system, similar systems, technologically similar problems, the management problems of similar systems, and the interfaces with the subject system results in better managed, higher quality software revisions. Experienced support personnel also shorten the learning curve for less experienced support personnel. See AFP 800-48 for more information.

GLOSSARY:

Experienced Personnel. Personnel who have an extensive historical perspective of the subject system and its software requirements, as well as the technical expertise and/or management expertise required to efficiently implement modifications to the delivered software products.

RESPONSE INSTRUCTIONS:

F/1: 10% or less experienced personnel during any one phase (Concept, Demonstration, Development, Deployment)
E/2: 10% to 20% experienced personnel during any one phase
D/3: 20% to 30% experienced personnel during any one phase
C/4: 30% to 40% experienced personnel during any one phase
B/5: 40% to 50% experienced personnel during any one phase
A/6: 50% or more experienced personnel during all phases

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 013

QUESTION: The number of operational support personnel has been adequate throughout the software life cycle phases.

ACTIVITY(IES): Operational Support

EXPLANATION: The number of personnel should be sufficient to support the responsibilities required by the program. Sufficient number is dependent on matching the experience, workload, and productivity requirements. Typically, fewer operational support persons are required during the concept phase, more persons during the demonstration and then development phases, and maximum personnel during the deployment phase of the project. One method of determining "sufficient" is to assume the allocated number of personnel is the most optimum and determine the ratio of actual to allocated personnel. Guidelines for an evaluation response based on this ratio are given below. See AFP 800-48 for more information.

GLOSSARY:

Number of Operational Support Personnel. The count of personnel directly responsible for operational support functions relative to the subject system. This includes direct software project management, technical staff, and support staff. Only those staff positions directly allocated, or through direct assignment of an allocated position, should be considered. If necessary, a "full time equivalent" (e.g., part of a position that is shared among one or more other systems) value can be used.

RESPONSE INSTRUCTIONS:

F/1: 0% to 50% of allocated load during any life cycle phase (Concept, Demonstration, Development, Deployment)
E/2: 50% to 60% of allocated load during any life cycle phase
D/3: 60% to 70% of allocated load during any life cycle phase
C/4: 70% to 80% of allocated load during any life cycle phase
B/5: 80% to 90% of allocated load during any life cycle phase
A/6: 90% or more of allocated load during all life cycle phase

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 014

QUESTION: The internal interfaces among procurement organization elements have been adequate.

ACTIVITY(IES): Procurement

EXPLANATION: Internal organization elements might include the program office, configuration management organization, development test and evaluation agency, operational test and evaluation agency, independent verification and validation organization, and various interservice elements as appropriate. Characteristics of the interfaces to be assessed include proper decision process information flow, effectiveness of information flow, and adherence to regulations and guidelines for interface responsibility.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 015

QUESTION: The internal interfaces among development contractor organization elements have been adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: Internal organization elements might include the project management, configuration management group, project technical staff, hardware and software group, quality assurance group, independent test group, contract management, and corporate management. Characteristics of the interfaces to be assessed include proper decision process information flow, effectiveness of information flow, and adherence to regulations and guidelines for interface responsibility.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 016

QUESTION: The internal interfaces among operational support organization elements have been adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: Internal organization elements might include the project management, configuration management group, project technical staff, hardware and software groups, quality assurance group, independent test group, contract management, and supporting and using command management. Characteristics of the interfaces to be assessed include proper decision process information flow, effectiveness of information flow, and adherence to regulations and guidelines for interface responsibility.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 017

QUESTION: The procurement physical organization structure has been adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The project physical structure is typically represented in an organization chart. The physical organization should have a logical relationship to the project WBS, with the specific physical organization elements having a well-defined functional responsibility for a part of the WBS. The software parts of the physical structure should be clearly identified and adequate to accomplish the responsibilities inherent in the WBS.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No physical organization chart or equivalent is available, or it is not current.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 018

QUESTION: The development contractor physical organization structure has been adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The project physical structure is typically represented in an organization chart. The physical organization should have a logical relationship to the project WBS, with the specific physical organization elements having a well-defined functional responsibility for a part of the WBS. The software parts of the physical structure should be clearly identified and adequate to accomplish the responsibilities inherent in the WBS.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No physical organization chart or equivalent is available, or it is not current.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(OS) - 019

QUESTION: The operational support physical organization structure has been adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The project physical structure is typically represented in an organization chart. The physical organization should have a logical relationship to the project WBS, with the specific physical organization elements having a well-defined functional responsibility for a part of the WBS. The software parts of the physical structure should be clearly identified and adequate to accomplish the responsibilities inherent in the WBS.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No physical organization chart or equivalent is available, or it is not current.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE PROJECT MANAGEMENT DESIGN METHODS

The questions SPM(DM)-001 through SPM(DM)-018 address adequacy of software project management design methods for the procurement, development contractor, and operational support activities. Project management design methods are established so that the functional requirements of a project can be more efficiently transcribed into an implemented product. The design methods include standards, conventions, regulations, directives, software language, review methods, high-level representation techniques and methodologies, automated design aids, and so forth.

There are generally two aspects of a design method that need to be evaluated. First, does the design method facilitate production of high quality software within limited available resources? Second, can the design method be transitioned to the software support activity for the evolution of the software products during postdeployment support?

The procurement activity is responsible for ensuring that adequate design methods have been required through the PMP, CDRLs, SOW, and any other procurement documents. The procurement activity is also responsible for understanding the nature and importance of the development contractor design methods and the effects that software design tradeoffs might have on the effective implementation of the desired system. The procurement activity should have its own methods of assessing whether system requirements and design specifications of those requirements are consistent, and whether the design adequately implements the requirements.

The development contractor activity is responsible for establishing design standards appropriate for the software being developed so that an operationally effective and supportable system is produced. Design representation techniques and automated design aids should be appropriate for development of the software design in an efficient manner and for transition to the operational support activity.

The operational support activity is responsible for making sure the development contractor is required to use design methods that can be effectively used during postdeployment support. Such design methods may require training for the support activity personnel. The operational support activity also has the responsibility to ensure that the support environment is to be supplied with all the necessary design aids to effectively accomplish software support.

QUESTION DATA SHEET

Question Number SPM(DM) - 001

QUESTION: The procurement design analysis studies have provided adequate design guidelines for the development contractor.

ACTIVITY(IES): Procurement

EXPLANATION: Design analysis studies include feasibility studies on the use of computer resources, tradeoff studies concerning programming language and instruction set architecture selections, alternate approaches for implementing security requirements, alternate approaches for achieving operational interoperability, and investigations of support concepts and environments. These studies are usually part of the Concept Exploration and Demonstration and Validation life cycle phases. The design guidelines that result range from specification of language and operational computer of choice to a working prototype of the complete system.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 002

QUESTION: The standards for software design required by the procurement activity are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The standards minimally include development contractor software development regulations such as DoD-STD-2167A, DoD-STD-2168, MIL-STD-483A, MIL-STD-490A, and MIL-STD-1521B. Generally, the RFP/CDRL/SOW will indicate minimal software design standards, and the related Data Item Descriptions will indicate the format and content of the resulting design specifications.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 003

QUESTION: The software design methodology used by the development contractor is adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: Typical design methodologies include approaches for life cycle events, personnel allocation by function, support resource management, and schedule/budget analyses. The life cycle approach might be top down, iterative refinement, waterfall, prototype, or some combination. The personnel allocation by function method may prescribe use of design-only, code-only, integrate-only, test-only, or management-only personnel. Or, it may prescribe personnel groups that handle some combination of these functions. Support resource management could include specification of the resources such as requirements analysis tool, structured analysis design tool, and automated tools for specification generation and translation to PDL and implemented source code. Simulators for design specifications and use of formal verification languages are other possible aspects of design methodology. The use of techniques such as hierarchy diagrams, HIPOs, N by N Charts, and data flow diagrams is important for representing the design and is the foundation of specific design methods.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 004

QUESTION: The design standards and methods adopted for use by the operational support activity during postdeployment software support are adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The operational support activity should adopt design standards and methods consistent with internal site product support standards and also consistent with the design standards and methods used by the development contractor. The CRLCMP should include information concerning the design methods selected.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 005

QUESTION: The System Design Review process has been adequate.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The objective of the System Design Review (SDR) is to formally assess the allocated system requirements before proceeding with the preliminary design of the computer hardware and software configuration items. The SDR should include review of the detailed system-level design and the allocation of system functions to individual hardware and software configuration items. The SDR should include evaluation of the optimization, traceability, completeness, and risks associated with the allocated technical requirements. A successful SDR will be predicated on the determination that the System Specification is an adequate basis for developing computer hardware and software configuration items.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 006

QUESTION: The software requirements appear to be reasonable.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The software requirements are initially derived at the functional level from procurement documents such as the Operational Requirement Document, Program Management Directive, Program Management Plan, and eventually the System/Segment Specification (A-spec). The software requirements must be an integral, well-defined part of the overall system requirements, and it must be clear what the relationship is among the software requirements and the system mission functions. Whether the software requirements are reasonable depends on the total number of requirements, the technology necessary to implement the requirements and associated functionality in software, the schedule and budget for development and support, and the environmental considerations of software personnel skills, interface requirements to the system, parallel hardware/software development requirements, and the system's functional mission.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 007

QUESTION: The number of software requirements that cannot be traced to an end item product is minimal.

ACTIVITY(IES): All

EXPLANATION: Procurement is responsible for the initial identification and partial allocation of software requirements to functional end item components in the System/Segment Specification (Functional Baseline). The operational support activity has a responsibility to assist in the definition of this Functional responsibility to assist in the definition of this Functional Baseline from the user and supporter viewpoints. The development contractor activity is responsible for continuing the software allocation process from the high-level functional description completely through to the low-level software modules and routines. It should be possible to trace each software requirement all the way down to the set of modules and routines that implement the requirement and to the specific test suite that verifies and validates the requirement. All requirements should be traceable to the CSCI level at the conclusion of preliminary design phase. See AFP 800-48 for more information.

GLOSSARY:

End Item. An implemented unit that is not decomposed further for purposes of identification. For procurement purposes, the usual end item is a CSCI. For development contractor purposes (and related unit, component, and integration testing), the end item may be the routine. The end item to consider will also depend on the software development phase.

RESPONSE INSTRUCTIONS:

General Guideline. For some systems 90% requirements traceability will be a low risk; for other systems it may be a high risk. Fuzzy indicators are if 15% to 20% of the requirements are not traceable, then the software development is a medium to high risk of compromising the desired mission goals. A more specific set of guidelines is:

F/1: 0% to 50% traceability to an end item appropriate to phase
E/2: 50% to 60% traceability to an end item appropriate to phase
D/3: 60% to 70% traceability to an end item appropriate to phase
C/4: 70% to 80% traceability to an end item appropriate to phase
B/5: 80% to 90% traceability to an end item appropriate to phase
A/6: 90% to 100% traceability to an end item appropriate to phase

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 008

QUESTION: The number of software requirements that cannot be tested are minimal.

ACTIVITY(IES): All

EXPLANATION: In the derivation of requirements, it is the responsibility of all activities to specify, at the appropriate level of specification, software requirements in a way such that tests can be defined to verify and validate that the software requirements have been met. The requirements may include a tolerance range of possible outcomes, a minimum/maximum absolute value, a subjective rating of a feature, or a domain/range of hardware and software outcomes. Although it is not necessary to specify test criteria to know whether a software requirement is testable, it is the best way to make sure there is no misinterpretation of whether a software requirement has passed or failed a test. See AFP 800-48 for more information.

GLOSSARY:

RESPONSE INSTRUCTIONS:

General Guideline. For some systems 90% requirements testability will be a low risk, for other systems it may be a high risk. Fuzzy indicators are if 15% to 20% of the requirements are not testable, then the software development is a medium to high risk of compromising the desired mission goals. A more specific set of guidelines is:

F/1: 0% to 50% requirements have testable specifications
E/2: 50% to 60% requirements have testable specifications
D/3: 60% to 70% requirements have testable specifications
C/4: 70% to 80% requirements have testable specifications
B/5: 80% to 90% requirements have testable specifications
A/6: 90% to 100% requirements have testable specifications

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 009

QUESTION: The profile of changes to software requirements is reasonable.

ACTIVITY(IES): Procurement and Development Contractor

EXPLANATION: The number of change actions (e.g., ECPs) that impact the software requirements, the severity/criticality of the changes, and the number of such changes opened/closed over a given time period determine what the change profile is. This profile will generally have a higher number of changes early in the development, decreasing with occasional upward spikes, to very few changes near the end of development. Too many changes that impact requirements, changes that are extremely severe, changes that are open for a long time, and erratic increases and decreases in the unresolved actions are indicative of potential problems. Change requests result from action items that are derived during informal and formal project reviews. See AFP 800-48 for more information.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 010

QUESTION: The profile of unresolved software review action items is reasonable.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: Unresolved (open) software review action items result from informal and formal software design reviews. Unresolved action items are expected to spike upward at each review and then exhibit exponentially decreasing behavior. Programs that issue clearly written specifications will experience spikes that are lower. Programs with good communication will have a higher rate of exponential decay. The count of unresolved software review action items must be maintained by the program office as well as the development contractor. See AFP 800-48 for more information.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 011

QUESTION: The development contractor requirements analysis process has been adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: A complete set of functional and performance requirements must be established for each CSCI. The requirements analysis accomplished during the Demonstration and Validation phase, and subsequent requirements validation, must continue during the Engineering and Manufacture Development phase to completely define the requirements. Interface requirements must be defined between CSCIs and HWCIs. All adaptations needed to accommodate different user sites must be identified. Requirements analysis must evaluate requirements for completeness, consistency, adequacy, testability, understandability, and supportability. As mission needs change, additional analyses may be required to determine the impact on software requirements.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 012

QUESTION: The development contractor top-level design process has been adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: A modular top-level software design should be developed from the software requirements. The preliminary design process should consider various design alternatives, analytical results, tradeoff studies, and capability to accommodate change. The design should identify computer software components (CSC) and define the data interfaces, control flow, and resource budgets for memory and execution time at the CSC level. Functional software requirements should be assigned to CSCs of the top-level design. An initial data base design should define structure and organization of the data base. The design of formal and informal tests should be developed and documented in the software plan for testing compliance of each CSCI with each applicable software and interface requirement. The preliminary design process culminates with the Preliminary Design Review conducted by both procurement and the development contractor activities and monitored by the operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 013

QUESTION: The development contractor detailed design process has been adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The detailed software design process should refine the CSCs of the top-level software design to successively lower-level design elements until, at the lowest level, they specify individual units to be developed. The detailed design should define all information required for coding these units, including control logic, algorithms, data, accuracy, and timing. For any interfaces with other CSCIs or HWCIs, detailed interface design should precisely define data formats, data flow, and timing constraints in sufficient detail for coding data structures and control routines. The data base design should be defined, including its constituent items, fields, records, and files. The detailed software test design should define the methods and criteria of conducting the individual tests previously identified in the Software Test Plan. Each test case should be designed in terms of inputs, expected results, and evaluation criteria (e.g., pass/fail). The test descriptions form the basis for subsequent development of test procedures. Descriptions of formal tests should require procurement activity approval. The detailed design process culminates with the Critical Design Review conducted by both the procurement and the development contractor activities and monitored by the operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 014

QUESTION: The design completion of CSCIs relative to the software life cycle development schedule has been reasonable.

ACTIVITY(IES): Development Contractor

EXPLANATION: The rate at which a development contractor completes CSCI designs may vary depending on the software development method selected. A prototype method may allow for some CSCIs to be completely coded before other CSCIs are even designed. The design completion criteria may thus be somewhat subjective and should be tailored to the particular system. Generally, the response guidelines should reflect adequate considerations of system life cycle phases and software development methodology being used. See AFP 800-48 for more information.

GLOSSARY:

Design Completion. CSCI has satisfactorily completed its detailed design specification (C-spec).

Design Deficiency. (Number of CSCIs planned for design completion minus the number of CSCIs actually designed) divided by the (number of CSCIs planned for design completion) all times 100.

RESPONSE INSTRUCTIONS:

F/1: 50% to 100% design deficiency
E/2: 40% to 50% design deficiency
D/3: 30% to 40% design deficiency
C/4: 20% to 30% design deficiency
B/5: 10% to 20% design deficiency
A/6: 0% to 10% design deficiency

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 015

QUESTION: The development contractor monitor of the subcontractor software design process has been adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: Any subcontractors to the prime development contractor who have software development responsibilities should be required to apply design standards and methods consistent with the prime contractor's required standards and methods. The prime contractor has ultimate responsibility to the procurement activity for delivery of quality software, hence subcontractor efforts in this area must be carefully monitored and reviewed, much as the procurement activity monitors and reviews the development contractor software development effort.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: There are no subcontractors with software development responsibilities.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 016

QUESTION: The design specifications for the software products contain adequate information to implement the software with the required functionality and within the schedule and budget requirements.

ACTIVITY(IES): All

EXPLANATION: The design specifications include the System/Segment Specification, the top-level design specification, the detailed design specifications, interface specifications, data base design specifications, and the test design specifications. The design specifications should adequately capture the transformation of requirements into a paper representation of the software solution, sufficiently precise to directly implement the software.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 017

QUESTION: The operational support concept for design of software revisions during postdeployment software support is adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The operational support concept should include design methods, top-level and detailed design process approaches, and test design methods. This concept should be consistent with the concept used by the development contractor.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(DM) - 018

QUESTION: The operational support concept for design review during postdeployment software support is adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The operational support concept should include preliminary and detailed design reviews as part of the software block release process. The reviews should be consistent with those used during Engineering and Manufacture Development, probably at a somewhat reduced scope, proportionate to the extensiveness of the changes in the block release and how much the software design has been affected by the changes.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE PROJECT MANAGEMENT IMPLEMENTATION METHODS

The questions SPM(IM)-001 through SPM(IM)-016 address adequacy of software project management implementation methods for the procurement, development contractor, and operational support activities. Project management implementation methods are established so that the design specifications of a project can be more efficiently transcribed into an implemented product. The implementation methods include standards, conventions, regulations, directives, software language, review methods, low-level representation techniques and methodologies, automated implementation aids, and so forth.

There are generally two aspects of an implementation method that need to be evaluated. First, does the implementation method facilitate production of high quality software within limited available resources? Second, can the implementation method be transitioned to the software support activity for the evolution of the software products during postdeployment support?

The procurement activity is responsible for ensuring that adequate implementation methods (e.g., coding standards, desk check procedures) have been required through the PMP, CDRL, SOW, and any other procurement documents. The procurement activity is also responsible for understanding the nature and importance of the development contractor implementation methods and the effects that software implementation tradeoffs might have on the desired system. The procurement activity should have its own methods of assessing whether software design and the implementation of that design are consistent, and whether the implementation is an adequate representation of the design.

The development contractor activity is responsible for establishing and using implementation standards appropriate for the software being developed so that an operationally effective and supportable system is produced. Implementation representation techniques and automated implementation aids should be appropriate for coding and integrating the software in an efficient manner and for transitioning the techniques and aids to the operational support activity.

The operational support activity is responsible for making sure the development contractor has requirements to use implementation methods that can be effectively used during postdeployment support. Such methods may require training for the support activity personnel. The operational support activity also has the responsibility to ensure that the software development environment is delivered with all the necessary implementation aids to effectively accomplish software support.

QUESTION DATA SHEET

Question Number SPM(IM) - 001

QUESTION: The procurement activity has adequately monitored the implementation of the software design specifications.

ACTIVITY(IES): Procurement

EXPLANATION: The time gap between the end of the major detailed design phase (Critical Design Review) and the beginning of system integration testing as signaled by the Test Readiness Review can be significant. It is necessary for the procurement activity to carefully monitor development contractor implementation progress through status reports, informal reviews, site visits, interim demonstrations, and the required software baseline change process.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 002

QUESTION: The procurement test organization interface with the development contractor is adequate enough to ensure success of the system integration tests.

ACTIVITY(IES): Procurement and Development Contractor

EXPLANATION: The primary test organizations are the DT&E agency, the OT&E agency, and possibly an IV&V organization. The system integration test success is directly dependent on the implementation progress of the development contractor. The operational test process also has such dependency. The IV&V (if any) will generally provide for supplementary testing that provides greater assurance that the implementation is all right and/or identifies problem areas that decrease assurance and lengthen the implementation phase.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 003

QUESTION: The operational support activity has been actively involved with the development contractor's software implementation in order to learn the software prior to officially accepting software support responsibility.

ACTIVITY(IES): Operational Support

EXPLANATION: All through the full-scale development, the operational support activity should monitor the progress of the development contractor's software development. During the implementation phase (latter part), some key operational support activity personnel should begin to actively learn the software design, implementation, integration, and test. This may take the form of formal course training and hands-on software modification to informal observations of the development contractor process.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: There are no plans for operational support personnel to actively participate in the software modification process.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 004

QUESTION: The standards for software implementation required by the procurement activity are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The standards minimally include development contractor software development regulations such as DoD-STD-2167A, DoD-STD-2168, MIL-STD-483A, MIL-STD-490A, and MIL-STD-1521B. Generally, the RFP/CDRL/SOW will indicate minimal software implementation standards, and the related Data Item Descriptions will indicate the format and content of the resulting implementation specifications.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 005

QUESTION: The implementation methodology used by the development contractor is adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: Typical implementation methodologies include approaches for life cycle events, personnel allocation by function, support resource management, and schedule/budget analyses. The life cycle approach might be top down, iterative refinement, waterfall, prototype, or some combination. The personnel allocation by function method may prescribe use of design-only, code-only, integrate-only, test-only, or management-only personnel. Or, it may prescribe personnel groups that handle some combination of these functions. Support resource management could include specification of the resources such as requirements analysis tool, structured analysis design tool, and automated tools for specification generation and translation to PDL and implemented source code. Simulators for design specifications and use of formal verification languages are other possible aspects of implementation methodology. The use of techniques such as code walkthroughs, simulation, symbolic debug, static code analysis, automated test case generators, regression testing is the foundation of code/unit test/integration implementation methods.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 006

QUESTION: The implementation standards and methods adopted for use by the operational support activity during postdeployment software support are adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The operational support activity should adopt implementation standards and methods consistent with internal site product support standards and also consistent with the implementation standards and methods used by the development contractor. The CRLCMP should include information concerning the implementation methods selected.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 007

QUESTION: The development contractor monitor of subcontractor software implementation process has been adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: Any subcontractors to the prime development contractor who have software development responsibilities should be required to apply implementation standards and methods consistent with the prime contractor's required standards and methods. The prime contractor has ultimate responsibility to the procurement activity for delivery of quality software, hence subcontractor efforts in this area must be carefully monitored and reviewed, much as the procurement activity monitors and reviews the development contractor software development effort.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: There are no subcontractors with software development responsibility.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 008

QUESTION: The implementation completion of CSCIs has been reasonable relative to the software life cycle schedule.

ACTIVITY(IES): Development Contractor

EXPLANATION: The rate at which a development contractor completes CSCI implementations may vary depending on the software development method selected. A prototype method may allow for some CSCIs to be completely tested before other CSCIs are even designed. The implementation completion criteria may thus be somewhat subjective and should be tailored to the particular system. Generally, the response guidelines should reflect adequate considerations of system life cycle phases and software development methodology being used. See AFP 800-48 for more information.

GLOSSARY:

Implementation Completion. Implementation of a CSCI is complete when the CSCI has satisfactorily completed its integration testing.

Implementation Deficiency. (Number of CSCIs planned for implementation completion minus the number of CSCIs actually implemented) divided by the (number of CSCIs planned for implementation completion) all times 100.

RESPONSE INSTRUCTIONS:

F/1: 50% to 100% implementation deficiency
E/2: 40% to 50% implementation deficiency
D/3: 30% to 40% implementation deficiency
C/4: 20% to 30% implementation deficiency
B/5: 10% to 20% implementation deficiency
A/6: 0% to 10% implementation deficiency

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 009

QUESTION: The procurement software project management support tool environment is adequate.

ACTIVITY(IES): Procurement

EXPLANATION: During the Concept Exploration and Demonstration and Validation phases, the necessary automated tools and procedures for procurement project management (software and hardware) should be identified, developed, and/or acquired. The tool environment should allow for budget and schedule management, mission requirements tracing, product deliverable status tracking, configuration management change status tracking, and management information communication capabilities among participating organizations. A current list of required tools, function of each tool, date required, and date acquired should be maintained.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 010

QUESTION: The development contractor software project management support tool environment is adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The development contractor activity is required to provide certain management information on the project status to the procurement activity. Automated project management functions would assist the development contractor in this effort. DoD-STD-2167A and its associated Data Item Descriptions, as called out in the CDRL, have specific requirements for development contractor data collection and reporting.

GLOSSARY:

RESPONSE INSTRUCTIONS:

If no automated project management tools are being used, then the response should be less than C/4.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 011

QUESTION: The development contractor software configuration management support tool environment is adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: Software configuration management is one of the most important management functions performed by the development contractor. Frequently, the amount of information to be retained, analyzed, and reported is very large. Thus, an automated support tool environment to this process is essential. Such a tool must be supplemented with adequate management procedures. Such a tool environment must have the capability to efficiently report on all software components under configuration control, current and planned changes to those components, and planned components not currently under control. Library management of software (specification, source, object, command language, load modules, test data, etc.) and the capability to automatically reconstruct current and precious versions of software components are required.

GLOSSARY:

RESPONSE INSTRUCTIONS:

If no automated project management tools are being used, then the response should be less than C/4.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 012

QUESTION: The development contractor system software tool environment is adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The precise configuration of a system development tool environment will vary somewhat depending on the particular application and the complexity of the software development effort.

GLOSSARY:

System Software Tool. Operating system, compiler, linker debugger, data base manager, methodology support tool, requirements generation tool, host system, and so forth.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 013

QUESTION: The development contractor application test software tool environment is adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The test environment tool set is critical for thorough unit testing and laboratory integration testing. The maturity of the software is still largely dependent on how completely the software can be tested.

GLOSSARY:

Application Software Test Environment. Software bench, target machine, laboratory integrated testbed, specialized test devices and instrumentation, special security facilities, simulators and emulators, and so forth.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 014

QUESTION: The operational support software support tool environment is adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The software support tool environment is one of the critical factors for software supportability. The software revisions must be developed, configuration controlled, and tested in a manner similar to the original engineering and manufacture development effort.

GLOSSARY:

Software Support Tool Environment. The systems of the Software Support Resources. Includes the system development software tool environment and the application software test tool environment as required by the support environment.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 015

QUESTION: The operational support software concept for implementation of software revisions during postdeployment software support is adequate.

ACTIVITY(IES): Operational Support.

EXPLANATION: The operational support concept should include coding style guidelines, methods for ensuring code correctness (e.g., quality assurance metrics, code desk checks) prior to unit test, unit and integration test methods, and operational test methods. The concept should include an overall software support plan that delineates how software releases are to be project and configuration managed. This plan is an internal detailed specification derived from the more high-level CRLCMP.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(IM) - 016

QUESTION: The operational support concept for implementation audits and reviews during postdeployment software support is adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The Review of implemented revisions has some parallel with the reviews and audits in the development process. However, the reviews tend to be less extensive. A Test Readiness Review should be conducted on the revised software baseline prior to operational testing of each block release. Informal reviews small-scale functional and physical configuration audit/reviews for configuration baseline update integrity, and test readiness reviews constitute the audits and reviews pertinent to the implementation phase of a block release.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE PROJECT MANAGEMENT TEST STRATEGIES

The questions SPM(TS)-001 through SPM(TS)-020 address adequacy of software project management test strategies for the procurement development contractor and operational support activities. Software test strategies are established so that the implemented product can be verified and validated against the requirement specifications. The test strategies include standards, conventions, regulations, directives, test languages, verification and validation methods, and automated test aids. Key to a reasonable test strategy is the generation of a test plan, test description, test procedures, test reports, demonstration tests, configuration management of test information, and transition of test strategy to the operational support activity.

There are generally two aspects of a test strategy that need to be evaluated. First, does the test strategy facilitate production of high quality software within limited available resources? Second, can the test strategy be used by the software support activity for the evolution of the software products during postdeployment support?

The procurement activity is responsible for ensuring that adequate test methods have been required or are planned through the PMP, CDRL, SOW, TEMP, DT&E and OT&E test plans, and any other procurement documents. The procurement activity is also responsible for understanding the nature and importance of the development contractor test strategies and the effects that various testing techniques might have on the verification and validation of the desired system. The procurement activity is responsible for making sure the DT&E, OT&E, IV&V, and development contractor test strategies are consistent and are complementary. The procurement activity should have its own methods of assessing whether software requirements have been adequately verified and validated and the amount and type of testing that is still required to achieve an operational capability.

The development contractor activity is responsible for establishing test standards appropriate for the software being developed so that an operationally effective and supportable system is produced. Test plans, techniques, schedules, and automated aids should be appropriate for thorough test of the software implementation and system integration. The test techniques, test cases, and test environment should be designed for transition to the operational support activity.

The operational support activity is responsible for making sure the development contractor is required to use a test strategy that can be effectively used during postdeployment support. The operational support activity also has the responsibility to ensure that the postdeployment software support test strategy is consistent with the development contractor's test strategy.

QUESTION DATA SHEET

Question Number SPM(TS) - 001

QUESTION: The TEMP adequately describes the software test and evaluation process.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The software test and evaluation process includes objectives, measures of effectiveness, organization responsibilities and interfaces, the DT&E and OT&E specific test interfaces, and the overall schedule and funding level of the test process. Any use of IV&V by procurement should be described along with the organization relationships and expected results. The TEMP is a concise description of the complete system test process, but there should be adequate attention to the software test process and appropriate reference to other planning documents for more detailed information.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: There is no TEMP.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 002

QUESTION: The software test process for DT&E has followed the guidelines in the TEMP.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The TEMP reflects top-level input from the DT&E organization and should be followed if the TEMP is to be an important, high-level planning document. Characteristics to be considered include schedule, planning and utilization of resources, derivation of high-level measures of effectiveness for the specified objectives and subobjectives, and the communication of test results with other test organizations.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: The TEMP does not exist or does not address software DT&E.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 003

QUESTION: The software test process for OT&E has followed the guidelines in the TEMP

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The TEMP reflects top-level input from the OT&E organization and should be followed if the TEMP is to be an important, high-level planning document. Characteristics to be considered include schedule, planning and utilization of resources, derivation of high-level measures of effectiveness for the specified objectives and subobjectives, and the communication of test results with other test organizations.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: The TEMP does not exist or does not address software OT&E.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 004

QUESTION: The implementation of the software test process by DT&E and OT&E organizations has been adequate.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The TEMP guidelines for the software test process should reflect the DT&E and OT&E approaches. The actual implementation of those guidelines is specified in the DT&E and OT&E organizations' plans. Check the effectiveness of the tests to stress the software components in a thorough manner. The assurance the tests provide that the software requirements have been verified at a low level of detail and validated in an operationally representative environment is one measure of how mature the software is likely to be during early postdeployment support.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: The DT&E and OT&E organizations do not have any specific software test plans.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 005

QUESTION: The test organizations have incorporated a strategy in their software test processes for coordination and sharing of test plans, procedures, and results.

ACTIVITY(IES): All

EXPLANATION: The test and evaluation directives require participation of the various test organizations (e.g., DT&E, OT&E, IV&V) across the complete system life cycle. In addition, the requirement is that these organizations coordinate their activities so as to be more effective and thorough. Thus, DT&E results should feed the OT&E process; the requirements of the OT&E process should affect the DT&E process; the IV&V process and results should not duplicate, but complement and supplement the DT&E, OT&E, and development contractor testing process. The development contractor testing process should be an integral part of the DT&E process and monitored closely by the OT&E agency and operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 006

QUESTION: The requirements for the development contractor software test strategy are clearly specified in the RFP, SOW, and/or CDRLs.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The best way to achieve a good contractor test strategy is to require one. The best way to do this is through the RFP, SOW, and the CDRLs. The form, methods, techniques, schedule, deliverables, transition, and so forth for the developing contractor test strategy should be described in the procurement documentation.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: The software test strategy is not defined in any of the documentation.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 007

QUESTION: The use of an organization for software test IV&V support has been effective.

ACTIVITY(IES): Procurement and Operation Support

EXPLANATION: The IV&V function is not always required or appropriate. For mission critical systems with significant software, it is usually required. The software IV&V may be separate from or a part of a system IV&V effort. For IV&V to be effective, it must usually be applied early in the software life cycle and comprise a significant (e.g., 10 to 30 percent) portion of the software development cost. There are specific instances where IV&V can be used to solely support DT&E and/or OT&E in their specific functions, in which case the IV&V function is less comprehensive and costly. This can be an especially effective way to obtain detailed software stress testing and evaluation that might not be done because of a shortage of test organization support personnel.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No IV&V function has been defined, but the system is a mission critical system with significant software functions.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 008

QUESTION: The overall planning for software testing has been adequate.

ACTIVITY(IES): All

EXPLANATION: The combination of procurement, development contractor, and operational support software test planning should reflect an integrated strategy for accomplishing the software test process throughout the software's complete life cycle. The various activities' test plans should identify and emphasize those aspects of primary responsibility. In particular, such plans should identify test items, features to be tested, features not to be tested, relationship of the test items to the baseline being tested and the functional system requirements, test approach and methodologies employed, pass/fail criteria, specific test tasks (WBS), test environment, test responsibility and resource requirements, and test schedules. The test plan, test descriptions, test log, test results, incidence reports, and any other test documentation to be produced should be described in the software test plans.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 009

QUESTION: The software test approach and methodologies employed are clearly described in the software test documentation and appear to be effective.

ACTIVITY(IES): All

EXPLANATION: The approach should be described for each major group of features to be tested. The major activities, techniques, and tools that are to be used should be described in enough detail to identify major testing tasks and estimation of the time required to do each one. The minimum degree of completeness should be specified along with the techniques (e.g., path coverage, statement coverage, domain space coverage) used to judge completeness. Acceptance criteria constraints such as test-item availability, test resource availability, schedule deadlines, and funding levels. Testing techniques include code reviews, structure analysis, static program quality analysis, dynamic path analysis, coverage analysis, assertion checking, symbolic debugging, mutation testing, and regression testing. Such techniques can be applied with varying success across the test phases of design verification, unit and module test, CSCI and system integration test, PQT/FQT, system test, and mission test. Application of testing techniques across test phases and descriptions of how the overall test objectives are to be achieved should be clearly specified in the test documentation.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 010

QUESTION: The software features to be tested and not to be tested are clearly described in the software test documentation.

ACTIVITY(IES): All

EXPLANATION: The software test documentation should identify features to be tested, features not to be tested, and all combinations of such features across the test cases.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: Software test documentation does not identify features to be tested and not tested.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 011

QUESTION: The traceability software features tested/not tested to the software functional requirements are described in the software test documentation.

ACTIVITY(IES): All

EXPLANATION: The software test documentation should provide assurance of which functional requirements of the software have/have not been satisfied. A clear association of the functional requirements with the software features and the related tests is a major step toward providing that assurance. Typically, a matrix or written description is provided. Use of a cross-reference among data dictionaries for requirements, features, and tests is another way such information can be presented.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No cross-reference exists among software features, test cases, and functional requirements.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 012

QUESTION: The software test deliverables are adequately specified in the software test documentation.

ACTIVITY(IES): All

EXPLANATION: The software test documentation should provide a complete list and description of all software test deliverables. A software test plan is the most logical location for such information. It should also be clearly stated how the deliverables relate to the CDRLs/DIDs in the case of the development contractor.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 013

QUESTION: The software test criteria used to determine whether each test has passed or failed are clearly specified in the software test documentation.

ACTIVITY(IES): All

EXPLANATION: The software test documentation should provide pass/fail criteria for each test and each software feature to be tested. The criteria should be as objective as possible. Examples of criteria include percentage of statements tested, percentage of logic paths tested, and faults (frequency, number of critical/noncritical) allowed.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: 50% or more of the tests/features have inadequate criteria
E/2: 40% to 50% of the tests/features have inadequate criteria
D/3: 30% to 40% of the tests/features have inadequate criteria
C/4: 20% or 30% of the tests/features have inadequate criteria
B/5: 10% to 20% of the tests/features have inadequate criteria
A/6: 0% to 10% of the tests/features have inadequate criteria

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 014

QUESTION: The personnel groups responsible for the software tests are adequately identified in the software test documentation.

ACTIVITY(IES): All

EXPLANATION: The software test documentation should clearly identify personnel groups who are responsible for the various software tests across all the test phases. In some cases the individual programmer will be responsible; in other cases a complete independent test group may be responsible. Responsibilities include managing, designing, preparing, executing, monitoring, checking, resolving anomalies, and acceptance/approval. A software test plan is the most likely source of this information, although individual test case descriptions are also a possible source.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: 50% or more tests have no responsible group identified
E/2: 40% to 50% tests have no responsible group identified
D/3: 30% to 40% tests have no responsible group identified
C/4: 20% or 30% tests have no responsible group identified
B/5: 10% to 20% tests have no responsible group identified
A/6: 0% to 10% tests have no responsible group identified

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 015

QUESTION: The high risk assumptions of the software testing approach along with contingency plans for each such assumption are adequately described in the software test documentation.

ACTIVITY(IES): All

EXPLANATION: The software test documentation should clearly identify any areas of high risk. Examples of high risk tests include those cases that would require interagency (e.g., interservice) allocation of resources such as test ranges, equipment, or personnel for which the availability is scarce. A schedule delay in such a test might cause a large ripple effect, not only in the subject system test schedule, but in the test schedule of systems competing for the same test resources. Alternate plans for handling such difficulties (resource availability, funding level, technical problems) should be described. A software test plan is the most likely source for identifying the high-risk test cases and high-level contingency plans. The individual test case description would probably provide more detail as to why the test case is high risk.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: 50% or more of the high risk tests have no contingency plan, or high risk tests exist but are not identified
E/2: 40% to 50% of the high risk tests have no contingency plan
D/3: 30% to 40% of the high risk tests have no contingency plan
C/4: 20% or 30% of the high risk tests have no contingency plan
B/5: 10% to 20% of the high risk tests have no contingency plan
A/6: 0% to 10% of the high risk tests have no contingency plan

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 016

QUESTION: The schedule for software test milestones is adequately specified in the software test documentation.

ACTIVITY(IES): Procurement and Development Contractor

EXPLANATION: The software test documentation should clearly identify the milestones for each test. These milestones are normally part of the software test plan/approach, the software project schedule that is a subpart of the system WBS schedule, or the system development schedule. The test milestones and their relationship to the overall software and system development schedule should be specified.

GLOSSARY:

Test Milestones. Completion of design, coding, unit test, hardware/software integration, documentation, acceptance are typical milestones.

RESPONSE INSTRUCTIONS:

F/1: 50% or more of the software tests have no milestone schedule
E/2: 40% to 50% of the software tests have no milestone schedule
D/3: 30% to 40% of the software tests have no milestone schedule
C/4: 20% or 30% of the software tests have no milestone schedule
B/5: 10% to 20% of the software tests have no milestone schedule
A/6: 0% to 10% of the software tests have no milestone schedule

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 017

QUESTION: Software testing is adequately prioritized in the software test approach according to mission criticality concerns.

ACTIVITY(IES): All

EXPLANATION: The software test approach should prioritize the software testing process according to mission critical features. For example, if certain software features are critical to the mission reliability of the system or perhaps the safety of the system personnel, then those features should receive a higher priority. Higher priority features may require more rigorous tests, more objective measures of test assurance, longer test schedule, and a more visible test reporting process.

GLOSSARY:

Mission Critical Feature. Any feature of the system that will prevent the completion of the mission objective or impact the safety of the personnel who are part of the mission if it is not developed correctly.

RESPONSE INSTRUCTIONS:

F/1: No prioritization of tests is apparent from the software documentation, or the defined prioritization is not being followed.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 018

QUESTION: The software test environment is adequately identified in the software test documentation and is adequate for accomplishing the required testing.

ACTIVITY(IES): All

EXPLANATION: The software test documentation should identify the software test environment including host emulation/simulation, software bench testing equipment, integrated laboratory environments, and operational mission test environments.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No identification of the software test environment is documented, or the environment is totally inadequate.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 019

QUESTION: The configuration management of the software test process is adequate.

ACTIVITY(IES): All

EXPLANATION: All activities have some responsibility for software test and evaluation. As such, each activity has a responsibility for its particular emphasis to maintain appropriate configuration management of the test process and its documentation. In particular, the procurement DT&E and OT&E test plans, approaches, descriptions, and results should be under tight configuration management. Likewise, the development contractor's software test documentation should be a contract deliverable, perhaps as a CSCI depending on the criticality of the software. The operational support software test documentation should be carefully controlled throughout the postdeployment support of the software.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No configuration management of the software test process and its documentation has been planned.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(TS) - 020

QUESTION: The transition of the software test strategy from the development contractor to the operational support activity has been adequately addressed in the software test documentation and the procurement software test plans.

ACTIVITY(IES): All

EXPLANATION: All transition of as much of the software test strategy as possible must be planned from the contract requirements through the program management responsibility transfer. From the procurement PMP, TEMP, CRLCMP, RFP, and CDRLs through development contractor and operational support activity software test planning, the transition must be integrated as a critical part of the software deliverable for supportability purposes.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No transition of the development contractor software test plan, test cases, test approach, or test tools is documented.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE PROJECT MANAGEMENT PROJECT INTERFACES

The questions SPM(PI)-001 through SPM(PI)-016 address adequacy of software project management external interfaces among the procurement, development contractor, operational support, and interservice organization elements as is appropriate. These project management interfaces are established so that project information can be more efficiently communicated. These interfaces include the physical relationship among the organization elements and the high-level logical relationship of the organization elements to the project's functional requirements.

There are generally two types of interfaces that are important to evaluate for any project: internal organization interfaces, and organization interfaces across external boundaries. The project interface evaluation primarily focuses on how well the external interfaces and basic project organization to support those interfaces for each major organization component facilities production of a high quality software product.

Characteristics that should be evaluated are the number of external interfaces, size of interface organizations, various working groups' interfaces, and application of directives and regulations to control the coordination among interfacing organizations. Typical interface working groups include the computer resources working group (CRWG), the test planning working group (TPWG), and the interface control working group (ICWG).

QUESTION DATA SHEET

Question Number SPM(PI) - 001

QUESTION: The system program office external interfaces are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The program office interfaces with the using command, the operational support activity, the training command, the test and evaluation agencies for DT&E and OT&E, special government contract service agencies such as the MITRE Corporation, and the development contractor. These external interfaces generally are concerned with Air Force policy, adherence to regulations and directives, interservice implications of the system under development, general computer resource management issues, and resource (personnel, systems, time, funds) planning and use. The program manager is the primary head of the program office and must ensure that the program office works with the various commands and agencies to establish the means to implement the system acquisition dictated in the PMD and described in the PMP. These interfaces help to define the technology constraints on the system and its software, including what advanced computer technology will be required to be applied. The initial emphasis on software supportability would be in the PMP.

GLOSSARY:

Program Office. An Air Force procuring activity, headed by a program manager, and established within a product division (e.g., Aeronautical Systems Division) early in the demonstration and validation phase for the purpose of fulfilling the program management responsibilities described in the system PMD.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 002

QUESTION: The implementing external interfaces are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The program office works to make sure the PMP addresses proper development issues and with the operational support activity and using command to ensure that the operational and support issues are properly addressed. If there is a development IV&V function, then the implementing command will interface with the IV&V contractor/agency to ensure proper coordination among the program office and the development contractor activity. The implementing command is the primary contract monitor and technical reviewer of the development contractor activity tasks. The implementing command project program manager must help to define the technology constraints on the system and its software, including what advanced computer technology will be required to be applied. The implementing command also participates in working groups such as the CRWG, ICWG, and TPWG. The initial emphasis on software supportability would be in the PMP.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 003

QUESTION: The using command external interfaces are adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The using command has the responsibility of operational deployment of a system, subsystem, or item of equipment. The using command has external interfaces with the operational support command, program office, and various working groups. During the acquisition of the system to be operated, the using command's primary interface role is as monitor to assist in deriving the system requirements necessary to make the system operationally effective. During the postdeployment software support, the using command interfaces with the operational support activity and various working groups concerning software block releases.

GLOSSARY:

Using Command: The command (or commands and contractor support) responsible for the operational employment of the acquired system.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 004

QUESTION: The operational support activity external interfaces are adequate.

ACTIVITY(IES): Operational Support

EXPLANATION: The operational support activity external interfaces include the program office, using command, working groups (CRWG, ICWG, TPWG) as appropriate. The primary functions of the interfaces are to ensure that the system as delivered is supportable and the appropriate support environment is acquired for use during postdeployment support.

GLOSSARY:

Operational Support Activity. The command/organization responsible for the configuration management, logistics support, and other kinds of direct support required by a system during operational use.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 005

QUESTION: The training command external interfaces are adequate.

ACTIVITY(IES): Procurement and Operational Support

EXPLANATION: The training command reviews system documents and initiates training support planning and evaluation, as appropriate, and provides and administers training programs to support systems. The interfaces for such training could include implementing, using, operational support activity, and the DT&E and OT&E agencies.

GLOSSARY:

Training Command. The command (e.g., HQ-AETC) responsible for providing planning, evaluation, conduct, and administration of training programs and training requirements.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 006

QUESTION: The development contractor external interfaces are adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The development contractor primary external interfaces are with the program office, implementing command, test and evaluation agencies (DT&E, OT&E, IV&V), operational support activity, using command, and working groups as is appropriate. The major function of the interfaces are communication of development requirements and status, conduct of integration and operational tests, and transfer of the developed system to the operational support activity.

GLOSSARY:

Development Contractor. The prime contractor and any subcontractors responsible for the full-scale development of the software system.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 007

QUESTION: The development test and evaluation (DT&E) organization external interfaces are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The implementing command is responsible for DT&E management. The development contractor and the implementing command jointly conduct the early part of DT&E. The specifics of the DT&E management is documented in the TEMP. DT&E data must be provided to the OT&E agency. Some of the functions of the interfaces are to communicate evaluation of contract specifications, system/software deficiencies, interoperability capability, and estimates of the system's operational reliability, supportability, availability, and safety. See AFR 80-14 for more information.

GLOSSARY:

DT&E Organization. The organization elements (primarily implementing command and development contractor) responsible for demonstrating that the system (including hardware and software) design and development is complete, that design risks have been minimized, and that the system will perform as required and specified.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 008

QUESTION: The operational test and evaluation (OT&E) organization external interfaces are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The OT&E is managed and conducted by AFOTEC. Interfaces with nearly all program organization elements are possible depending on the system being acquired. Some of the functions of these interfaces are to communicate an estimate of the system's operational effectiveness and suitability, identify operational deficiencies, recommend changes, and identify system/software characteristics and deficiencies that can significantly impact support costs. See AFI 99-102, and AFOTECI 99-101 for more information.

GLOSSARY:

OT&E Organization. The organization elements (primarily AFOTEC or other service operational test agencies) responsible for the estimation of a system's operational effectiveness and suitability, identification of any operational and support deficiencies, and identification of any need for modifications.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 009

QUESTION: The computer resources working group (CRWG) external interfaces are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: For each system utilizing computer resources, a CRWG must be established immediately after Milestone I to aid in the management of the system's computer resources and in the development of the CRLCMP. The purpose of the CRWG is to assist the program manager in initiating activities that are prerequisites to development and support of computer resources. The CRWG should also assist in ensuring that computer resources comply with established policy, procedures, plans, and standards. The CRWG should include representatives of the procurement activity, operational support activity, and also other organizations that have been assigned responsibilities for software development, testing, training, and support.

GLOSSARY:

CRWG. Computer resources working group is chaired by the program office and consists of representatives of the participating commands and test organizations. Primary function is to produce the CRLCMP.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 010

QUESTION: The test planning working group (TPWG) external interfaces are adequate.

ACTIVITY(IES): All

EXPLANATION: The TPWG assists the program manager on test matters. This assistance includes defining responsibilities and relationships among test program participants; establishing test objectives; preparation of the TEMP; identifying test resources; preparing test portions of RFPs, SOWs, and related contractual documents; and acting as a forum for surfacing and resolving test related issues.

GLOSSARY:

TPWG. The test planning working group is chaired by the implementing command with representatives from the using and supporting commands, the test organizations (DT&E, OT&E), and where appropriate, the development contractor and subcontractors.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 011

QUESTION: The interface control working group (ICWG) external interfaces are adequate.

ACTIVITY(IES): All

EXPLANATION: The procurement activity should establish an ICWG to address system/subsystem interface requirements, including those that affect computer resources. Early in the system acquisition process, the ICWG supports the procurement activity in defining current and proposed computer software and hardware interfaces. The interface description should include quantitative data needed to accurately define interfaces. Interoperability requirements should be included in the interface definition. The procurement, development contractor, and operational support activities should provide computer resource inputs to the ICWG to ensure that system interfaces adequately reflect software and hardware characteristics.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 012

QUESTION: The independent verification and validation (IV&V) agency external interfaces are adequate.

ACTIVITY(IES): All

EXPLANATION: The procurement activity should determine IV&V requirements. The CRWG will assess the need for IV&V and provide recommendations to the procurement activity. The determination should consider the criticality of the system mission, the risk associated with the development, and the level of software complexity. The procurement activity should define the scope and timing of the IV&V and develop a plan for the IV&V effort. The IV&V decisions should be documented in the CRLCMP. If IV&V is to be included in the software development, it must be initiated not later than the award of the development contract. Procurement activities for the IV&V effort should be completed in advance of the software specification review to allow verification of the software requirements before the review is conducted. The procurement activity shall control the interface between the IV&V agency and the development contractor and provide the IV&V agency with copies of the appropriate development specifications, design documents, listings, and discrepancies found by the IV&V agency.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 013

QUESTION: The software configuration management interfaces among all activities' management components for the subject system are adequate.

ACTIVITY(IES): All

EXPLANATION: Each of the activities has a responsibility for configuration management that requires interface communication. Assignment of identification numbers is a procurement and operational support responsibility dependent on the development contractor formal request for such numbers. The procurement activity maintains the formal baseline (functional, allocated, product) while the development contractor maintains developmental baseline up to delivery of the product baseline. Changes, refinements, and so forth must be communicated. The procurement and development contractor must coordinate transfer of configuration management responsibility as defined in the CRLCMP with the operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 014

QUESTION: The software quality assurance management interfaces among all activities' management components for the subject system are adequate.

ACTIVITY(IES): All

EXPLANATION: The overall software quality program for the computer software development cycle should be defined by the procurement activity and operational support activity through contractual requirements. Responsibility for assessing computer software products and related procedures may be assigned to more than one organization. It may be appropriate for an independent organization, such as an IV&V organization, that is subject to neither financial nor managerial control by the development contractor, to perform certain of these assessments.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 015

QUESTION: The contract management interfaces among all activities' management components for the subject system are adequate.

ACTIVITY(IES): All

EXPLANATION: Contractual provisions should reflect the government's requirements for rights to the computer software and associated documentation. Development contractor limited-rights software to be used in the performance of the contract or to be delivered under the contract should be identified. Predetermination agreements should be included in the contract to enable the government to subsequently acquire additional required rights. Because computer resources (including computer software) may be developed under a subcontract to a prime contractor, the procurement activity should ensure that all appropriate contractual requirements levied on the prime development contractor are passed to the subcontractor. The procurement activity should ensure that the contract makes the subcontractor responsible for the integrity of subcontracted products and makes the prime development contractor responsible for delivery of an acceptable product under the contract.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SPM(PI) - 016

QUESTION: The interservice external interfaces with all activities' management components are adequate.

ACTIVITY(IES): All

EXPLANATION: Before each system milestone, interservicing potential should be reviewed and the management and life cycle cost implications of major software support options should be analyzed. This analysis should also consider impact on operational needs, configuration management, and system integration. For interservice systems, the CRWG and ICWG shall be interservice groups that include representatives from the cognizant participating organization elements (commands agencies, etc.). The interservice working groups should ensure that analysis is performed to determine the optimum support approach, this analysis is documented, and recommendations are made to the procurement activity concerning the support approach.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: There are no joint service requirements for the system or its embedded software.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE CONFIGURATION MANAGEMENT IDENTIFICATION

The questions SCM(ID)-001 through SCM(ID)-021 address issues of software configuration identification for the procurement, development contractor, and operational support activities. Configuration identification is established in the form of technical documentation that becomes more detailed as development proceeds and more refined as the final development products are evolved during postdeployment support. Three stages of configuration identification are generally employed during the software system's life cycle:

(1) Functional Configuration Identification
(2) Allocated Configuration Identification
(3) Product Configuration Identification

In addition, the development contractor activity has internal iterations of the identifications called Development Identifications which are controlled by the necessary internal software configuration management process.

These identifications correspond to the system development baselines:

(1) Functional Baseline
(2) Allocated Baseline
(3) Product Baseline

and, the appropriate development contractor development baselines. The Identifications become Baselines when the procurement activity approves the Identifications and puts the configuration identification under its contractual configuration control system. Identification is used for visibility, and baselines are used for control.

The term "identification" also has an important secondary meaning as a document or set of documents that defines the configuration of an item. In this sense, it represents one or more material things (documents).

QUESTION DATA SHEET

Question Number SCM(ID) - 001

QUESTION: The procurement policy, standards, and conventions applied to the identification of software configuration items are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: Identification of computer software configured items and procedures for assigning identification numbers/names is described in AFR 800-21. It is the responsibility of the procurement activity to ensure that proper policy, standards, and conventions are required for the naming of configured items. Directive and guidance documents include AFR 800-14. Contractor compliance documents that could be required include MIL-STD-480A, MIL-STD-482A, MIL-STD-483A, and MIL-STD-490A, and DoD-STD 2167A.

GLOSSARY:

Software Configuration Items. Software elements that are designated for configuration control by the contractual requirements.

Identification. The official character/numeric identifier of a configured item and its functional purpose and relationship with other configured items for purposes of configuration management.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 002

QUESTION: The procurement identification of deliverable software configuration items is adequate.

ACTIVITY(IES): Procurement

EXPLANATION: Frequently, software items are not required to be delivered. The CDRL is the basis for delivery. The CDRLs should carefully identify all operational, test, and support software deliverable. Included with this identification is the form of the deliverable (e.g., document, source, object, load module) and the medium on which the deliverable will be produced. Include in the contract all software including firmware and proprietary items that are required to cost effectively use, operate, or modify the system over its life cycle. If it is not cost effective to acquire a software item, include an option to acquire it later.

GLOSSARY:

Deliverable Software. Identified by CDRLs.

Operational Software. Required to operate the system.

Test Software. Used to analyze or test system and component performance.

Support Software. Used generally to develop or maintain other software. Includes system software such as operating systems and compilers.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 003

QUESTION: The procurement activity identification of the software configuration baselines is adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The software configuration baselines include the Functional Baseline, Allocated Baseline, and Product Baseline. When the procurement activity approves the development Configuration Identification for each of these baselines, then the Identification becomes the corresponding Baseline and is put under the procurement activity configuration control. This requires the procurement activity to have adequate identification capability to maintain such configuration control.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 004

QUESTION: The system/segment specification adequately identifies elements of the software functional baseline.

ACTIVITY(IES): Procurement

EXPLANATION: The system/segment specification is a formally controlled software item of a system procurement. This specification defines the Functional Configuration Identification of the software. The first version is usually prepared by the procurement activity and becomes a living document of the system/segment performance-oriented requirement. When it is approved by the procurement activity, it is "baselined" and comes under configuration control as the Functional Baseline. The Functional Baseline should be available at Milestone I, prior to Demonstration and Validation. It is critical that this specification reflect as complete a perspective on the functional aspects of the system as possible. It is also critical that this specification mature as early as possible to minimize perturbations on the rest of the system baselines.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 005

QUESTION: The performance requirement specifications adequately identify elements of the software allocated baseline.

ACTIVITY(IES): Procurement

EXPLANATION: The performance requirement specifications are the descriptions of how the Functional Baseline is allocated into CSCIs (Computer Software Configuration Items) and HWCIs (Hardware Configuration Items). These specifications include preliminary requirement documents and become living documents. When they are approved by the procurement activity, they are "baselined" as the Allocated Baseline. The Allocated Baseline should be available at Milestone II, prior to engineering and manufacture development. It is critical that these specifications reflect as complete a perspective on the detailed function allocation, test, and interface aspects of the system as possible. It is also critical that these specifications mature as early as possible to minimize engineering and manufacture development perturbations.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 006

QUESTION: The implementation specifications adequately identify elements of the software product baseline.

ACTIVITY(IES): Development Contractor

EXPLANATION: The implementation specifications are the description of how the Allocated Baseline has been implemented as CSCIs (Computer Software Configuration Items) and HWCIs (Hardware Configuration Items). These implementation specifications include the "as built" detailed design documents and become living documents. When they are approved by the procurement activity, they are "baselined" and become the Product Baseline. It is critical that these specifications reflect as complete a perspective on the detailed design and coded aspects of the system as possible. It is also critical that these specifications mature as early as possible to facilitate the transfer, operation, and support of the software.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 007

QUESTION: The identifier characteristics for software configuration item names are adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The identifier characteristics include uniqueness, retrievability, traceability, pronouncibility, variability, functional significance, and compactness.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 008

QUESTION: The development contractor internal identifier naming standards/conventions satisfy contractual regulations.

ACTIVITY(IES): Development Contractor

EXPLANATION: The development contractor is (should be) required to follow Air Force regulations on Computer Program Identification Number (CPIN) assignments. Air Force directive guidance is found in AFR 800-14, along with other documents. The development contractor compliance documents are DoD-STD-480A, MIL-STD-482A, MIL-STD-483A, and MIL-STD-490A.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 009

QUESTION: Development contractor identification standards and conventions can be transitioned to operational support standards and conventions.

ACTIVITY(IES): Development Contractor

EXPLANATION: In order for computer resources to be smoothly transitioned from the development contractor to the operational support activity, the configuration identification standards and conventions must be compatible. As more automated tools are used, this requirement for compatibility will be even stronger. Evidence of the standards and transition strategy should be in the CRLCMP as well as the development contractor software configuration management plan.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No standards exist for the development contractor activity and/or the operational support activity.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 010

QUESTION: Development contractor deliverable configuration items are named to adequately identify multiple versions and variations.

ACTIVITY(IES): Development Contractor

EXPLANATION: The minimum requirement is for the name to provide for discrimination of versions. If software must be configured specifically for test purposes, multiple sites, and so forth, it will be necessary for the name to distinguish such variations of each version.

GLOSSARY:

Version. Baseline release of a configuration controlled item.

Variation. One of at least two physical configurations of the same version of a configuration controlled item. Variations of a version exist to support multiple service requirements as well as mission specific configurations (test, operational mission scenarios, alternate embedded computer systems, etc.).

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 011

QUESTION: Development contractor identification procedures are structured to permit easy addition, deletion, or modification of configured items at any hierarchical level.

ACTIVITY(IES): Development Contractor

EXPLANATION: The identification procedures should be specified in the Software Configuration Management Plan or perhaps a set of procedures to implement portions of the Plan. Hierarchical levels are CSCI, component, module, and routine. Such procedures are essential for adequate software supportability.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No such procedures are documented or are totally inadequate.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 012

QUESTION: Development contractor identification procedures for addition, deletion, and modification of configured items are being followed.

ACTIVITY(IES): Development Contractor

EXPLANATION: It should be possible to determine whether identification procedures are being followed through the standard management reporting requirements.

GLOSSARY:

RESPONSE INSTRUCTIONS:

F/1: No such procedures exist or are being totally ignored.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 013

QUESTION: The physical medium of configured items is adequately described by the development contractor software component/item identification scheme.

ACTIVITY(IES): Development Contractor

EXPLANATION: The physical medium (e.g., tape, disk, memory components) of configured items is required to meet government standards. Part of those standards address identification names/numbers. It should be possible to trace the medium of a configured item from its descriptive label/name and any distinguishing aspects of the medium (e.g., working/master tape, sequential volume number for multivolume storage items).

GLOSSARY:

Medium. Disk, tape, card deck, firmware, read-only memory, etc.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 014

QUESTION: The development contractor software identifiers adequately distinguish among different states (e.g., course, object, load, core images, listings) of the software.

ACTIVITY(IES): Development Contractor

EXPLANATION: The identifier should distinguish which state the software item is. For example, a distinguishing suffix might be attached to the software item identifier, such as: ".prg," ".txt," ".cmd," ".dat."

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 015

QUESTION: The development contractor software change control form is adequate.

ACTIVITY(IES): Development Contractor.

EXPLANATION: The change control form identifiers should meet requirements of applicable government standards and provide sequential identification suitable for logging, filing, reference, and retrieval.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 016

QUESTION: Subcontractor configuration item identification practices are monitored by the development contractor.

ACTIVITY(IES): Development Contractor

EXPLANATION: If there is a subcontractor, it will be necessary that the development contractor require configuration identification practices similar to those required by the procurement activity. If this is not done, then the development contractor will be required to retrofit the identification scheme of the subcontractor. The identification practices of the subcontractor must be carefully monitored to ensure compatibility.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: No subcontractors are involved with producing software configuration items for the development contractor.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 017

QUESTION: The documentation that collectively identifies the content of a configuration item is adequate.

ACTIVITY(IES): Development Contractor.

EXPLANATION: The documentation might include a version description document or a software configuration index. The version description document usually identifies changes to a baseline product components (e.g., in a hierarchical chart) showing component.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 018

QUESTION: Software configured items that implement safety provisions are adequately identified.

ACTIVITY(IES): Development Contractor

EXPLANATION: Configured items that implement safety provisions are frequently controlled by software. This software must be adequately identified as affecting safety. Safety provisions are closely related to the reliability of mission critical components, safety of mission personnel, nuclear effects, and so forth.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: There is no requirement for safety provisions to be implemented or controlled by software.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 019

QUESTION: Software configured items that implement computer/communication security provisions are adequately identified.

ACTIVITY(IES): Development Contractor

EXPLANATION: Software that implements computer/communication security is particularly important. Any such software items must be adequately identified as part of the trusted computer base. If the configured software items are themselves classified, then appropriate security labels must be attached according to Air Force labeling requirements.

GLOSSARY:

Security Provisions. The totality of threats, vulnerabilities, and protection mechanisms involved with determining whether computer/communications assets can be compromised through data, process, or abuse violations. Security provisions exist across the administrative system, and facility categories.

RESPONSE INSTRUCTIONS:

A/6: There is no requirement for security provisions to be implemented in software.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 020

QUESTION: The identification requirements for postdeployment support are adequately addressed in the CRLCMP.

ACTIVITY(IES): Operational Support.

EXPLANATION: The Computer Resources Life Cycle Management Plan or CRLCMP is the planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the support evolution of the computer resources including configurations management features. The CRLCMP (first version) is required early in the life cycle, usually in concept exploration phase. Key to adequacy is the compatibility of the operational support configuration identification and the development contractor configuration identification.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(ID) - 021

QUESTION: The automated support tools for postdeployment support of configuration identification are adequately addressed in the CRLCMP.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan or CRLCMP is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The use of automated support tools during development and transition of those tools to use during postdeployment support is an important consideration for the overall enhancement of software supportability. The lack of such tools to manage the configuration identification index of the various baselines should be considered a serious deficiency.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE CONFIGURATION MANAGEMENT CONTROL

The questions SCM(CC)-001 through SCM(CC)-023 address issues of software configuration control for the procurement, development contractor, and operational support activities. Configuration control is the major process of configuration management. It is the process by which change decisions are made (by the Configuration Control Board structure), administered (by the Configuration Management Office of the Program Office--or equivalent), and implemented (by change control personnel appropriate to the life cycle state of the software).

The decision-making part of configuration control determines whether proposed changes to a controlled document or software item will be beneficial to the government in terms of operational effectiveness, support needs, cost, and/or schedule. The change administration and implementation parts ensure that all approved changes to a configuration are properly incorporated in the affected documents and software code and that no other changes find their way in.

Configuration control focuses on the approved baselines:

(1) Functional Baseline
(2) Allocated Baseline
(3) Product Baseline

and, the appropriate development contractor development baselines.

Software items and documents that are not baselined are not subject to baseline configuration control, but may be placed under internal (contractor or support) configuration control during the software life cycle. Baseline configuration control relies on interaction among the procurement, development contractor, and operational support activities. The adequacy of the development contractor internal configuration control is important since the plans, techniques, and tools would be beneficial for transfer to the operational support activity for use during the postdeployment life cycle phase. From the operational support viewpoint, it is not sufficient that the development contractor activity can control the baselines sufficiently to deliver a configured product. For smooth transition, it is necessary that the configuration control process can be transitioned to or is compatible with the support activity configuration control process.

Interface control is also a very important aspect of configuration control, especially with systems that have multiservice operational requirements and systems that require more than one element for development or support. Separate control boards and review boards and integrated working groups are required to manage the complicated development and support requirements.

QUESTION DATA SHEET

Question Number SCM(CC) - 001

QUESTION: The procurement policy, standards, and conventions applied to the control of software configuration items are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: Control of computer software configured items and procedures for changing configured items are described in directives, regulations, and guidelines. It is the responsibility of the procurement activity to ensure that proper policy, standards, and conventions are required for the control of configured items. Contractor compliance documents that could be required include MIL-STD-480A, MIL-STD-482, MIL-STD-483A, MIL-STD-490A, and DoD-STD-2167A.

GLOSSARY:

Software Configuration Items. Software elements that are designated for configuration control by the contractual requirements.

Control. The process of systematic oversight of changes to a configured item and its functional relationship with other configured items for purposes of configuration management.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 002

QUESTION: The procurement activity has implemented adequate software configuration management, based on regulations, to control the functional and physical characteristics of all CSCIs.

ACTIVITY(IES): Procurement

EXPLANATION: The procurement program manager is responsible for implementing a configuration management program that will identify, document, and control the functional and physical characteristics of all CSCIs under development. Primary planning document is the Program Management Plan (PMP). Other activities include coordinating requirements with using and supporting agencies, reviewing contractor plans, auditing contractor implementation of plans, ensuring configuration identifications for all CSCIs are properly documented, controlling engineering changes to baselines, providing interface control for distribution of changes, and preparing for transfer to the operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 003

QUESTION: The procurement configuration management planning documents contain sufficient guidance for configuration control.

ACTIVITY(IES): Procurement

EXPLANATION: The major planning documents for procurement are the Program Management Plan (PMP), the Request for Proposal (RFP)/Statement of Work (SOW), the Contract Data Requirements List (CDRL), and the Computer Resources Life Cycle Management Plan (CRLCMP). AFR 800-14 calls for the inclusion of configuration management concepts in the PMP including configuration control (specification and interfaces). The RFP/SOW defines the exact scope of the development contractor's configuration control responsibilities. The CDRL identifies all deliverable data items including CSCIs that the development contractor must deliver and control. The CRLCMP must also include assignment of configuration control responsibilities during postdeployment software support with the detailed procedures.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 004

QUESTION: The development contractor configuration management activities are adequately monitored by the procurement activity.

ACTIVITY(IES): Procurement

EXPLANATION: The procurement activity can monitor development contractor configuration management activities through contractor documents and reports, other program office areas (e.g., quality assurance), configuration audits, and evaluation checklists (e.g., PCA and PCA preparation checklists in MIL-STD-1521B, ECP preparation checklists in DoD-STD-480A and modified by MIL-STD-483A).

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 005

QUESTION: The procurement configuration control procedures for the Class I and Class II changes (or equivalent categories) are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The Class I changes involve primarily any major changes to the Configuration Baselines, contractual provisions, support compatibility, and so forth. Class II changes are for minor deficiencies and do not generally require procurement approval, but there should still exist a mechanism for procurement review since many times Class II changes could cause side effects that might result in the change being reclassified as a Class I change. A Class II change is justified if it benefits the development contractor and is not detrimental to the government (procurement and operational support). Guidance for Class I and Class II changes is found in DoD-STD-480A, MIL-STD-483A, and other government internal and compliance documents.

GLOSSARY:

Class I Change. Engineering change that affects a Baseline Identification, performance outside stated tolerance, external interface characteristics, budget/resource requirements, or other factors of major significance to the operational effectiveness or suitability of the software product.

Class II Change. Engineering change not classified as Class I. Included minor changes such as typographical errors in documents, addition of comments to source code, changes to adaptation data such as data base parameters, and single recompilations.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 006

QUESTION: The use of deviations and waivers by the development contractor that could affect the supportability of the software has been adequately controlled by the procurement activity.

ACTIVITY(IES): Procurement

EXPLANATION: The use of deviations and waivers must be carefully monitored for the possible adverse affect on software's supportability even though the operational effectiveness may not seem to be directly affected. As an example, if the use of a High Order Language is waived, then the supportability of the software has been affected.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 007

QUESTION: The procurement baseline control forms are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The procurement baseline control forms might include Engineering Change Proposal (ECP), Specification Change Notice SCN), Request for Waiver, Software Deficiency Report, and Software Change Report.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 008

QUESTION: The procurement configuration control board procedures are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The procurement CCB procedures include conduct of meetings, maintenance of records, control of the baselines, integration of hardware and software concerns during the change process, formation of a separate software configuration control board if the complexity of the software so justifies such a board, and control of interoperability interface problems across any associated systems. Change control procedures should provide for careful evaluation of all ECPs according to existing configuration management directives. In particular, CSCI changes that have an effect on multiple-location applications, nuclear safety, security, cost, schedule, other CSCIs, other hardware or interfaces, and support resources must be carefully analyzed for overall benefit to the government.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 009

QUESTION: The procurement procedures for turnover and transfer of configuration control to the operational support activity have been adequately planned.

ACTIVITY(IES): Procurement

EXPLANATION: The CRLCMP should contain specific guidance as to the form and format of transition to the operational support activity. Key to the adequacy of this process is the amount of early planning and the specificity of the details in the CRLCMP at the milestone (and interim milestone) decision points. Frequently, the mere existence of such documents does not imply that they are at all adequate.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 010

QUESTION: Development contractor configuration control standards and conventions can be transitioned to operational support standards and conventions.

ACTIVITY(IES): Development Contractor

EXPLANATION: The CRLCMP should contain specific guidance as to the form and format of the transition to the operational support activity. Key to the adequacy of this process is the amount of early planning and the specificity of the details in the CRLCMP at the milestone (and interim milestone) decision points. Frequently, the mere existence of such documents does not imply that they are at all adequate.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 011

QUESTION: The development contractor configuration control board has an adequate interface with the procurement activity configuration control board.

ACTIVITY(IES): Development Contractor

EXPLANATION: AFR 800-14 requires computer program configuration management to be integrated into the overall system configuration management and across all cognizant organization elements. Interfaces are very important, and one of the most important is the communication between the procurement and development contractor configuration control boards. The CCBs are the official organizations empowered to act on all proposed changes. The primary changes that would require interfacing are Class I changes. MIL-STD-483A is the primary development contractor compliance regulation.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 012

QUESTION: The development contractor configuration control board procedures are adequate to distinguish between hardware and software failures.

ACTIVITY(IES): Development Contractor

EXPLANATION: For large systems, separate hardware and software boards may be established under a system level board. Failure reporting must adequately characterize failures so determination of the source of the failure is possible. Such reports and solutions to failures can then be processed more adequately by the control boards.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 013

QUESTION: The development contractor configuration control procedures can be transitioned to or are compatible with the operational support activity planned configuration control procedures.

ACTIVITY(IES): Development Contractor

EXPLANATION: The CRLCMP describes the operational support planned configuration control procedures, usually in accordance with AFR 57-4. Contractor compliance documents include DoD-STD-480A and MIL-STD-483A. The contractor's configuration control procedures should be documented in a Software Configuration Management Plan.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 014

QUESTION: The development contractor automated support tools for configuration control of baselines and internal development identifications are adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The automated support tools might include a control library, automated procedures to lock out multiple personnel from modifying a module at the same time, automated version and variation identification, automated traceability of requirements, design, code, test elements, and so forth. The use of automated tools is essential for complex software systems.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 015

QUESTION: The development contractor software change control forms are adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The change control forms should meet requirements of applicable government standards, and provide sequential identification suitable for logging, filing, reference, and retrieval. Content should adequately address source of change request, reason for request, type (enhancement, correction) of request, effect of change on the system, resource requirements to implement the change, and administrative information such as approval signatures required and expected (actual) change milestone dates.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 016

QUESTION: Subcontractor configuration item control practices are monitored by the development contractor.

ACTIVITY(IES): Development Contractor

EXPLANATION: If there is a subcontractor, it will be necessary that the development contractor require configuration control practices similar to those required by the procurement activity. If this is not done, then the development contractor will be required to retrofit the control practices of the subcontractor. The control practices of the subcontractor must be carefully monitored to ensure compatibility and proper interfaces of the cognizant configuration control boards.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: No subcontractors have responsibility for development of software products.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 017

QUESTION: Configured items that implement safety provisions are adequately controlled.

ACTIVITY(IES): Development Contractor

EXPLANATION: Configured items that implement safety provisions are frequently controlled by software. This software must be adequately identified as affecting safety. Safety provisions are closely related to the reliability of mission critical components, safety of mission personnel, nuclear effects, and so forth.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: There is no requirement for safety provisions to be implemented or controlled by software.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 018

QUESTION: Software configured items that implement computer/communications security provisions are adequately controlled.

ACTIVITY(IES): Development Contractor

EXPLANATION: Software that implements computer/communication security is particularly important. Any such software items must be adequately controlled as part of the trusted computer base. If the configured software items are themselves classified, then appropriate security labels must be attached according to Air Force labeling requirements, and access control of such items must be enforced.

GLOSSARY:

Security Provisions. The totality of threats, vulnerabilities, and protection mechanisms involved with determining whether computer/communications assets can be compromised through data, process, or abuse violations. Security provisions exist across the administrative, system, and facility categories.

RESPONSE INSTRUCTIONS:

A/6: There is no requirement for security provisions to be implemented in software.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 019

QUESTION: Distribution of configured item changes from the operational support activity to the field is adequately controlled.

ACTIVITY(IES): Operational Support

EXPLANATION: The distribution must satisfy applicable standards and regulations for technical orders as well as the mission critical issues of correctness of changes and timeliness of changes. Interfaces among operational support and field support organization elements, including configuration boards and logistics supply for technical orders, are critical to the success of the distribution process.

GLOSSARY:

RESPONSE INSTRUCTIONS:

Timeliness of the distribution process after engineering release is complete is one of the critical issues to consider. Although there are no fixed standards, it seems reasonable that no more than 50 percent of the time spent for engineering should be required to complete the distribution to the field. This "percentage" is bound by a lower absolute value of time required based on physical limitations (e.g., prom burning, technical order generation) of the distribution process.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 020

QUESTION: The configuration control responsibility for integrating computer resources into the system has remained centralized throughout the life of the system.

ACTIVITY(IES): All

EXPLANATION: Although organizational elements (e.g., HQ ACC, HQ AFSPACECOM) may have configuration control responsibilities for separate elements of the system (e.g., software, hardware), there should be a centralized control point for all decisions (perhaps a set of configuration control boards). As the software is passed from the development contractor to the operational support activity, the configuration control responsibilities are passed from the centralized development configuration control to the centralized support configuration control, with appropriate planning and attention to the actual transfer of responsibility.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 021

QUESTION: The configuration control requirements for postdeployment support are adequately addressed in the CRLCMP.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan (CRLCMP) is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The CRLCMP (first version) is required early in the life cycle, usually in concept exploration. Key to adequacy is the compatibility of the operational support configuration control and the development contractor configuration control procedures and automated tool support.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 022

QUESTION: The operational support configuration control boards are adequately defined to handle software changes.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan (CRLCMP) is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The configuration control boards along with specific board responsibilities should be defined in the CRLCMP. It is not enough to indicate that a given directive, regulation, standard, or guideline will be followed. Specific detail as to the board function, relationship to the organizational structure, interface responsibilities, and so forth should be included in the operational support configuration management plan and procedures.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(CC) - 023

QUESTION: The automated support tools for postdeployment support of configuration control are adequately addressed in the CRLCMP.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan (CRLCMP) is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The use of automated support tools during development and transition of those tools to use during postdeployment software support is an important consideration for the overall enhancement of software supportability. The lack of such tools to assist in the configuration control of the various baselines should be considered a serious deficiency.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE CONFIGURATION MANAGEMENT STATUS ACCOUNTING

The questions SCM(SA)-001 through SCM(SA)-015 address issues of software configuration status accounting for the procurement, development contractor, and operational support activities. Configuration status accounting is the process of keeping track of the configuration identification and its changes and reporting this information to management. Two types of documents are produced by configuration status accounting: (1) Software Configuration Index: defines the current approved configuration of an item in terms of its elements or identification documents and its approved changes, and (2) Change Status Reports: for deficiency and modification changes to a configured item.

These configuration status accounting documents provide all activities with visibility and traceability of baseline configurations and their changes. Coordination of activities and decisions regarding these activities such as scheduled reviews, audits, tests, use of test resources, requirements for budget adjustments to the contract, and so forth are based on configuration status accounting information.

QUESTION DATA SHEET

Question Number SCM(SA) - 001

QUESTION: The procurement policy, standards, and conventions applied to the configuration status accounting of software configuration items are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: Documentation for describing and reporting the status of computer software configured items is described in DoD and Air Force directives, regulations, and guidelines, including AFR 57-4, AFR 800-14, and DoDD 5010.21. It is the responsibility of the procurement activity to ensure that proper policy, standards, and conventions are required for the configuration status accounting of configured items. Contractor compliance documents that could be required include MIL-STD-480A, MIL-STD-482, MIL-STD-483A, MIL-STD-490A, and DoD-STD-2167A.

GLOSSARY:

Software Configuration Items. Software elements that are designated for configuration status accounting by the contractual requirements.

Configuration Status Accounting. The means through which actions affecting CSCIs are recorded and reported to program and functional managers.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 002

QUESTION: The procurement activity has implemented adequate software configuration status accounting, based on regulations, to report the functional and physical characteristics of all CSCIs.

ACTIVITY(IES): Procurement

EXPLANATION: The procurement program manager is responsible for implementing a configuration management program that will identify, document, and control the functional and physical characteristics of all CSCIs under development. Primary planning document is the Program Management Plan (PMP). Other activities include coordinating requirements with using and supporting agencies, reviewing contractor plans, auditing contractor implementation of plans, ensuring configuration identifications for all CSCIs are properly documented, controlling engineering changes to baselines, controlling distribution of changes, and preparing for transfer to the operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 003

QUESTION: The procurement configuration management planning documents contain sufficient guidance for configuration status accounting.

ACTIVITY(IES): Procurement

EXPLANATION: The major planning documents for procurement are the Program Management Plan (PMP), the Request for Proposal (RFP)/Statement of Work (SOW), the Contract Data Requirements List (CDRL), and the Computer Resources Life Cycle Management Plan or CRLCMP. AFR 800-14 calls for the inclusion of configuration management concepts in the PMP (including specification and interfaces). The RFP/SOW defines the exact scope of the development contractor's configuration status accounting responsibilities. The CDRL identifies all deliverable data items including CSCIs that the development contractor must deliver and control. The CRLCMP is to include CSCI configuration baseline reporting procedures to account for the implementation of changes. Detailed procedures should also be in the CRLCMP.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 004

QUESTION: The procurement activity configuration status accounting procedures are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The procurement activity configuration status accounting procedures include procedures to report baseline configuration identification and change status, contract management modifications, specification status and changes, ECPs and SCNs, and any other documents that record the software history of development and support. This history will to be transferred to the operational support activity. This history provides traceability to the configuration management process and the resulting software products. Use of automated support tools should aid the effectiveness and efficiency of the configuration status accounting procedures.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 005

QUESTION: The development contractor internal configuration status accounting procedures are adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: Procedures should be documented in a required software configuration management plan. Procedures include how information on status is to be collected, verified, stored, processed, and reported and the identification of the periodic reports to be provided and their distribution. Information to be maintained includes status of specifications and proposed changes, reports of approved changes, status of product versions or revisions, reports of the implementation of installed updates or releases, and status of procurement supplied property.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 006

QUESTION: The development contractor configuration status accounting has an adequate interface with the procurement activity configuration status accounting.

ACTIVITY(IES): Development Contractor

EXPLANATION: AFR 800-14 requires computer program configuration management to be integrated into the overall system configuration management and across all cognizant organization elements. The status accounting interface between procurement and development contractor is the basis for reporting all significant baseline product actions and the current state of those actions. Early resolution of problems is a direct function of how accurately, concisely, and efficiently such status accounting information is presented. The primary changes that require interface status reports are Class I changes. MIL-STD-483A is the primary development contractor compliance regulation.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 007

QUESTION: The development contractor configuration status accounting procedures can be transitioned to or are compatible with the operational support activity planned configuration status accounting procedures.

ACTIVITY(IES): Development Contractor

EXPLANATION: The CRLCMP describes the operational support planned configuration status accounting procedures, usually in accordance with DoD-STD-480A and MIL-STD-483A. The operational support activity's internal configuration status accounting procedures should be documented in a Software Configuration Management Plan or an associated set of procedures.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 008

QUESTION: The development contractor automated support tools for configuration status accounting of baselines and internal development identifications are adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The automated support tools might include a control library, automated procedures for form generation and retrieval, automatic traceability for version control, implemented changes, and outstanding problem reports. Traceability of requirements, design, code, and test elements is important for keeping track of precise configuration identification of baseline data. The use of automated tools is essential for complex software systems.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 009

QUESTION: The development contractor software configuration status accounting forms are adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The status accounting forms must provide adequate information to track internal development baselines as well as the Functional, Allocated, and Product baselines. MIL-STD-482A contains configuration status accounting data elements and related features. Typical government forms include ECP, SCN, configuration control board directive, time compliance technical order, deficiency report, and change/modification report. Internal status accounting forms must be adequate to track necessary status reporting such as problem analysis, solution, change implementation, and closure. In addition, general reporting documents such as a product status report, open software problems report, and deliverable document status report must be maintained in order that contractually required status information can be adequately derived and justified.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 010

QUESTION: Subcontractor configuration item configuration status accounting procedures are monitored by the development contractor.

ACTIVITY(IES): Development Contractor

EXPLANATION: If there is a subcontractor, it will be necessary that the development contractor require configuration status accounting practices similar to those required by the procurement activity. If this is not done, then the development contractor will be required to retrofit the configuration status accounting scheme of the subcontractor. The configuration status accounting identification practices of the subcontractor must be carefully monitored to ensure compatibility.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: No subcontractors are involved with producing software configuration items for the development contractor.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 011

QUESTION: Status of software configuration items that implement safety provisions is adequately reported.

ACTIVITY(IES): Development Contractor

EXPLANATION: Configured items that implement safety provisions are frequently controlled by software. Status of this software must be adequately monitored and reported as affecting safety. Safety provisions are closely related to the reliability of mission critical components, safety of mission personnel, nuclear effects, and so forth.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: There is no requirement for safety provisions to be implemented or controlled software.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 012

QUESTION: Status of software configured items that implement computer/communications security provisions is adequately reported.

ACTIVITY(IES): Development Contractor

EXPLANATION: Software that implements computer/communication security is particularly important. Any such software items must be adequately controlled as part of the trusted computer base. If the configured software items are themselves classified, then appropriate security labels must be attached according to Air Force labeling requirements and access control of such items must be enforced. Status information on such software must be reported.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: There is no requirement for security provisions to be implemented in software.

RESPONSE RATIONALE:

RESPONSE SCORE:

(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 013

QUESTION: The configuration status accounting requirements for postdeployment support are adequately addressed in the CRLCMP.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan (CRLCMP) is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The CRLCMP (first version) is required early in the life cycle, at least prior to engineering and manufacture development. Key to adequacy is the compatibility of the operational support configuration status accounting and the development contractor configuration status accounting.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 014

QUESTION: The operational support configuration status accounting procedures are adequately defined to handle software change reporting requirements.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan (CRLCMP) is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The configuration status accounting procedures together with specific responsibilities should be defined in the CRLCMP. It is not enough to indicate that a given directive, regulation, standard, or guideline will be followed. Specific details as to the format and content of status reports, organizational structure, interface responsibilities, and so forth should be included in the operational support Software Configuration Management Plan.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

QUESTION DATA SHEET

Question Number SCM(SA) - 015

QUESTION: The automated support tools for postdeployment support of configuration status accounting are adequately addressed in the CRLCMP.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan (CRLCMP) is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The use of automated support tools during development and transition of those tools to use during postdeployment support is an important consideration for the overall enhancement of software supportability. The lack of such tools to manage the configuration status accounting of the various baselines should be considered a deficiency.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

RESPONSE SCORE:
(COMPLETELY AGREE = 6,5,4,3,2,1 = COMPLETELY DISAGREE)

SOFTWARE CONFIGURATION MANAGEMENT AUDIT/REVIEW

The questions SCM(AR)-001 through SCM(AR)-013 address issues of software configuration Audit/Review for the procurement, development contractor, and operational support activities. Software Configuration Audit/Review is conducted to verify that a completed software product satisfies requirements. Procurement conducts official contractual configuration-oriented audits and reviews. Portions of the development reviews (PDR, CDR, Test Readiness Review (TRR)) are devoted to configuration-oriented review of production products as identified in developmental baselines. The major configuration audits for procurement are:

(1) Functional Configuration Audit (FCA)
(2) Physical Configuration Audit (PCA)

A Formal Qualification Review (FQR) for each CSCI constitutes a configuration audit if it is included as part of the CSCI Configuration Index. In this case, procurement and perhaps operational support representatives review the product specifications, Preliminary Qualification Test (PQT) data, and Formal Qualification Test (FQT) data to certify that the CSCI is qualified for its intended application. The FQR follows the FCA and PCA.

The operational support activity has a responsibility to monitor procurement and development contractor audits and reviews. This monitor information is integrated into the operational support plans. The operational support configuration audit/review is similar to the procurement for the formal baselines and like the development contractor for the internal audits and reviews.

QUESTION DATA SHEET

Question Number SCM(AR) - 001

QUESTION: The procurement policy, standards, and conventions applied to the audit and review of software configuration items are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: Audit/review of computer software configured items is described in directive, regulations, and guideline, including AFR 57-4, DoDD 5000.29, AFR 800-14, and DoDD 5010.21. It is the responsibility of the procurement activity to ensure that proper policy, standards, and conventions are required for the audit/review of configured item. Contractor compliance documents that could be required include MIL-STD-480A, MIL-STD-482, MIL-STD-483A, MIL-STD-490A, MIL-STD-1521B, and DoD-STD-2167A.

GLOSSARY:

Software Configuration Items. Software elements that are designated for Configuration Audit/Review by the contractual requirements.

Audit/Review. The process of informal and formal verification that a particular product has satisfied a specified set of requirements.

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 002

QUESTION: The procurement activity has implemented adequate software configuration audit/ review based on regulations to control the functional and physical characteristics of all CSCIs.

ACTIVITY(IES): Procurement

EXPLANATION: The procurement program manager is responsible for implementing a configuration management program that will identify, document, and control the functional and physical characteristics of all CSCIs under development. Primary planning document is the Program Management Plan (PMP). Other activities include coordinating requirements with using and supporting agencies, reviewing contractor plans, auditing contractor implementation of plans, ensuring configuration identifications for all CSCIs are properly documented, controlling engineering changes to baselines, providing interface control for distribution of changes, and preparing for transfer to the operational support activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 003

QUESTION: The procurement configuration management planning documents contain sufficient guidance for configuration audit/review.

ACTIVITY(IES): Procurement

EXPLANATION: The major planning documents for procurement are the Program Management Plan (PMP), the Request for Proposal (RFP)/Statement of Work (SOW), the Contract Data Requirements List (CDRL), and the Computer Resources Life Cycle Management Plan (CRLCMP). AFR 800-14 calls for the inclusion of configuration management concepts in the PMP including specification and interfaces. The RFP/SOW defines the exact scope of the development contractor's configuration audit/review responsibilities. The CDRL identifies all deliverable data items including CSCIs that the development contractor must deliver and control. The CRLCMP is to include assignment of configuration audit/review responsibilities during postdeployment with detailed procedures.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 004

QUESTION: The conduct of formal reviews and audits follows a format based on the checklists from MIL-STD-1521B, appropriately tailored for the specific software audit/review.

ACTIVITY(IES): Procurement

EXPLANATION: The MIL-STD-1521B is the compliance document for development contractor audits and reviews. It is procurement's responsibility to provide the guidance for standards, regulations, and tailoring guidance that is required. It is the development contractor's responsibility to follow the requirements. There are related configuration audits and evaluation checklists (e.g., FCA and PCA preparation checklists in MIL-STD-1521B, ECP preparation checklists in DoD-STD-480A and modified by MIL-STD-483A, Computer Resource Manager's Checklist based on AFR 800-14).

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 005

QUESTION: The software product acceptance requirements are adequate.

ACTIVITY(IES): Procurement

EXPLANATION: The software product acceptance criteria should be clearly documented. The acceptance tests, demonstrations, DT&E, OT&E, qualification tests, audits, and reviews all form a part of these acceptance requirements. The procurement activity has the responsibility to make sure such acceptance requirements are cost effective, functionally adequate, and specified from the time of the RFP/SOW/CDRL. Frequent modification to the original requirements indicates a lack of understanding concerning the original system specifications. This is likely to result in a less mature system to be supported.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 006

QUESTION: The development contractor internal configuration audit/review process facilitates the development of high quality production software.

ACTIVITY(IES): Development Contractor

EXPLANATION: The internal development contractor procedures for audit and review can be an important part of the process to build in software supportability characteristics in the software products. This shows up on both the transition of life cycle processes and in the transition of the software product baseline. The internal audit/review process also tends to reflect how successful the formal contractual audit/reviews will be.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 007

QUESTION: Configuration audit/review interfaces among procurement, development contractor, and operational support activities are adequate.

ACTIVITY(IES): Development Contractor

EXPLANATION: The activities require information from all levels of the audit/review process in order to properly plan for specific activity resources, funding levels, resolution of problems, and so forth. An interface control working group is an appropriate medium for coordinating schedule, responsibilities, contractual aspects, and results of the audit/reviews.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 008

QUESTION: The development contractor configuration management tool support facilitates the audit/review of the process by which changes are incorporated into configuration identifications.

ACTIVITY(IES): Development Contractor

EXPLANATION: It is required to audit/review all changes that have been incorporated into a configuration identification. It greatly facilitates the audit/review process if the change process is automated and tool support is available to indicate the configuration identification with and without the incorporated changes. Configuration identification compactor tools can indicate which elements of the configuration identification have been changed as a confirmation of the incorporated changes. The availability of such automated tool support greatly facilitates the efficiency and accuracy of the audit and review activity.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 009

QUESTION: Subcontractor configuration item audit/review practices are monitored by the development contractor.

ACTIVITY(IES): Development Contractor

EXPLANATION: If there is a subcontractor, it will be necessary that the development contractor require configuration audit/review practices similar to those required by the procurement activity. If this is not done, then the development contractor will be required to retrofit the audit/review scheme of the subcontractor. The audit/review practices of the subcontractor must be carefully monitored to ensure compatibility.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: No subcontractors are involved with producing software configuration items for the development contractors.

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 010

QUESTION: Configured items that implement safety provisions are adequately audited and reviewed.

ACTIVITY(IES): Development Contractor

EXPLANATION: Configured items that implement safety provisions are frequently controlled by software. This software must be adequately identified as affecting safety. Safety provisions are closely related to the reliability of mission critical components and safety of mission personnel, nuclear effects, and so forth.

GLOSSARY:

RESPONSE INSTRUCTIONS:

A/6: There is no requirement for safety provisions to be implemented or controlled by software.

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 011

QUESTION: Software configured items that implement computer/communications security provisions are adequately audited and reviewed.

ACTIVITY(IES): Development Contractor

EXPLANATION: Software that implements computer/communication security is particularly important. Any such software items must be adequately audited/reviewed as part of the trusted data base. If the configured software items are themselves classified, then appropriate security labels must be attached according to Air Force labeling requirements. Adequacy of such labeling procedures should be audited/reviewed.

GLOSSARY:

Security Provisions. The totality of threats, vulnerabilities, and protection mechanisms involved with determining whether computer/communications assets can be compromised through data, process, or abuse violations. Security provisions exist across the administrative, system, and facility categories.

RESPONSE INSTRUCTIONS:

A/6: There is no requirement for security provisions to be implemented in software.

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 012

QUESTION: The software configuration audit/review requirements for postdeployment support are adequately addressed in the CRLCMP.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan (CRLCMP) is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The CRLCMP (first version) is required early in the life cycle, at least prior to engineering and manufacture development.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

QUESTION DATA SHEET

Question Number SCM(AR) - 013

QUESTION: The automated support tools for postdeployment support of configuration audit/review are adequately addressed in the CRLCMP.

ACTIVITY(IES): Operational Support

EXPLANATION: The Computer Resources Life Cycle Management Plan (CRLCMP) is the key planning document for operational support configuration management. The CRLCMP is intended to be a living document, evolving to provide a current view of the configuration management features along with the evolution of the system. The use of automated support tools during development and transition of those tools for use during postdeployment support is an important consideration for the overall enhancement of software supportability. The lack of such tools to assist in the audit and review of the various baselines should be considered a serious deficiency.

GLOSSARY:

RESPONSE INSTRUCTIONS:

RESPONSE RATIONALE:

SUMMARY LIST OF QUESTIONS

This attachment contains a summary list of all Software Life Cycle Process questions. The questions are listed in the order in which they appear in attachment 1.

SOFTWARE PROJECT MANAGEMENT PLANNING

SPM(PL) - 001: QUESTION: Planning for computer resources has been adequate with respect to acquisition, development, logistics, and training.

SPM(PL) - 002: QUESTION: Procurement planning for computer resources has been consistent with the system development and acquisition plan.

SPM(PL) - 003: QUESTION: Planning for computer resources has been based upon an acquisition schedule with adequately specified milestones.

SPM(PL) - 004: QUESTION: Computer resources have been adequately addressed as major considerations at procurement reviews, audits, and management evaluations.

SPM(PL) - 005: QUESTION: Planned computer resources have been analyzed adequately by procurement to ensure conformance with stated operational and support requirements.

SPM(PL) - 006: QUESTION: Procurement planning software quality attributes have been adequately emphasized throughout the software life cycle acquisition.

SPM(PL) - 007: QUESTION: Margins for reserve computer resource capacity to provide for later product improvements are adequate.

SPM(PL) - 008: QUESTION: Acceptable techniques have been used to estimate and monitor software costs throughout the system life cycle.

SPM(PL) - 009: QUESTION: The CRLCMP contains adequate specifications of the acquisition requirements for computer resources.

SPM(PL) - 010: QUESTION: The CRLCMP adequately addresses the responsibilities and procedures to ensure proper software configuration management throughout the system life cycle.

SPM(PL) - 011: QUESTION: The project management responsibility for integrating computer resources into a system has remained centralized throughout the life of the system.

SPM(PL) - 012: QUESTION: The CRWG organization has been adequate throughout the system life cycle.

SPM(PL) - 013: QUESTION: The CRWG has had clearly specified responsibilities and appropriate authority to implement those responsibilities throughout the system life cycle.

SPM(PL) - 014: QUESTION: The CRWG has properly ensured that computer resources comply with established policy, procedures, plans, and standards.

SPM(PL) - 015: QUESTION: Software quality assessment procedures have been adequately defined to meet management policies and appropriate regulations, conform to standards, and meet performance and quality requirements throughout the system life cycle.

SPM(PL) - 016: QUESTION: Planning for DT&E of computer resources has been adequate throughout the system life cycle.

SPM(PL) - 017: QUESTION: Planning for OT&E of computer resources has been adequate throughout the system life cycle.

SPM(PL) - 018: QUESTION: Software standards have been adequately specified throughout the software life cycle.

SPM(PL) - 019: QUESTION: The planning for organic and/or contractor support during post-deployment software support has been adequate.

SPM(PL) - 020: QUESTION: Contractual documents have explicitly established government rights to all computer resources required to develop, operate, simulate, test, and support the software.

SPM(PL) - 021: QUESTION: Planning for risk analysis to identify areas of computer resource risk has been adequate.

SPM(PL) - 022: QUESTION: A mission/function matrix (or equivalent) clearly identifies primary functional capabilities to be implemented by the software.

SPM(PL) - 023: QUESTION: Planning for interoperability with other systems has been adequately addressed.

SPM(PL) - 024: QUESTION: Prior to each system milestone, interservicing potential and life cycle cost implications of software support options have been appropriately addressed.

SPM(PL) - 025: QUESTION: The procurement and operational support planning documents have been adequately updated as living documents throughout the system life cycle.

SPM(PL) - 026: QUESTION: The principles and methodologies provided in the regulations have been appropriately incorporated into the software test and evaluation plans.

SPM(PL) - 027: QUESTION: Planning for systematic, quantitative, and objectively reportable software tests has been adequate.

SPM(PL) - 028: QUESTION: Planning for sharing of software test results across life cycle phases and among test organizations has been adequate.

SPM(PL) - 029: QUESTION: Tracking of computer resource utilization has been adequately planned.

SPM(PL) - 030: QUESTION: The project software budget/cost variance (budgeted - actual) appears to be reasonable.

SPM(PL) - 031: QUESTION: The project software schedule/cost variance (consumed - scheduled) appears to be reasonable.

SPM(PL) - 032: QUESTION: The cost and schedule contractual reporting requirements appear to be adequate.

SOFTWARE PROJECT MANAGEMENT ORGANIZATION STRUCTURE

SPM(OS) - 001: QUESTION: The software requirements have been adequately allocated to elements of a Work Breakdown Structure (WBS).

SPM(OS) - 002: QUESTION: The software-related tasks are clearly identified in the WBS.

SPM(OS) - 003: QUESTION: The key project personnel and their assignments in relation to the WBS software related tasks are clearly identified.

SPM(OS) - 004: QUESTION: The coordination of modifications to the WBS among all activities has been adequate.

SPM(OS) - 005: QUESTION: The procurement personnel staffing has had continuity throughout the software life cycle phases.

SPM(OS) - 006: QUESTION: The ratio of experienced procurement project personnel to the total number of project personnel has been adequate throughout the software life cycle phases.

SPM(OS) - 007: QUESTION: The number of procurement personnel has been adequate throughout the software life cycle phases.

SPM(OS) - 008: QUESTION: The development contractor personnel staffing has had continuity throughout the software life cycle phases.

SPM(OS) - 009: QUESTION: The ratio of experienced development contractor project personnel to the total number of project personnel has been adequate throughout the software life cycle phases.

SPM(OS) - 010: QUESTION: The number of development contractor personnel has been adequate throughout the software life cycle phases.

SPM(OS) - 011: QUESTION: The operational support personnel staffing has had continuity throughout the software life cycle phases.

SPM(OS) - 012: QUESTION: The ratio of experienced operational support project personnel to the total number of project personnel has been adequate throughout the software life cycle phases.

SPM(OS) - 013: QUESTION: The number of operational support personnel has been adequate throughout the software life cycle phases.

SPM(OS) - 014: QUESTION: The internal interfaces among procurement organization elements have been adequate.

SPM(OS) - 015: QUESTION: The internal interfaces among development contractor organization elements have been adequate.

SPM(OS) - 016: QUESTION: The internal interfaces among operational support organization elements have been adequate.

SPM(OS) - 017: QUESTION: The procurement physical organization structure has been adequate.

SPM(OS) - 018: QUESTION: The development contractor physical organization structure has been adequate.

SPM(OS) - 019: QUESTION: The operational support physical organization structure has been adequate.

SOFTWARE PROJECT MANAGEMENT DESIGN METHODS

SPM(DM) - 001: QUESTION: The procurement design analysis studies have provided adequate design guidelines for the development contractor.

SPM(DM) - 002: QUESTION: The standards for software design required by the procurement activity are adequate.

SPM(DM) - 003: QUESTION: The software design methodology used by the development contractor is adequate.

SPM(DM) - 004: QUESTION: The design standards and methods adopted for use by the operational support activity during postdeployment software support are adequate.

SPM(DM) - 005: QUESTION: The System Design Review process has been adequate.

SPM(DM) - 006: QUESTION: The software requirements appear to be reasonable.

SPM(DM) - 007: QUESTION: The number of software requirements that cannot be traced to an end item product is minimal.

SPM(DM) - 008: QUESTION: The number of software requirements that cannot be tested is minimal.

SPM(DM) - 009: QUESTION: The profile of changes to software requirements is reasonable.

SPM(DM) - 010: QUESTION: The profile of unresolved software review action items is reasonable.

SPM(DM) - 011: QUESTION: The development contractor requirements analysis process has been adequate.

SPM(DM) - 012: QUESTION: The development contractor top-level design process has been adequate.

SPM(DM) - 013: QUESTION: The development contractor detailed design process has been adequate.

SPM(DM) - 014: QUESTION: The design completion of CSCIs relative to the software life cycle development schedule has been reasonable.

SPM(DM) - 015: QUESTION: The development contractor monitor of the subcontractor software design process has been adequate.

SPM(DM) - 016: QUESTION: The design specifications for the software products contain adequate information to implement the software with the required functionality and within the schedule and budget requirements.

SPM(DM) - 017: QUESTION: The operational support concept for design of software revisions during postdeployment software support is adequate.

SPM(DM) - 018: QUESTION: The operational support concept for design review during post-deployment software support is adequate.

SOFTWARE PROJECT MANAGEMENT IMPLEMENTATION METHODS

SPM(IM) - 001: QUESTION: The procurement activity has adequately monitored the implementation of the software design specifications.

SPM(IM) - 002: QUESTION: The procurement test organization interface with the development contractor is adequate enough to ensure success of the system integration tests.

SPM(IM) - 003: QUESTION: The operational support activity has been actively involved with the development contractor's software implementation in order to learn the software prior to officially accepting software support responsibility.

SPM(IM) - 004: QUESTION: The standards for software implementation required by the procurement activity are adequate.

SPM(IM) - 005: QUESTION: The implementation methodology used by the development contractor is adequate.

SPM(IM) - 006: QUESTION: The implementation standards and methods adopted for use by the operational support activity during postdeployment software support are adequate.

SPM(IM) - 007: QUESTION: The development contractor monitor of subcontractor software implementation process has been adequate.

SPM(IM) - 008: QUESTION: The implementation completion of CSCIs has been reasonable relative to the software life cycle schedule.

SPM(IM) - 009: QUESTION: The procurement software project management support tool environment is adequate.

SPM(IM) - 010: QUESTION: The development contractor software project management support tool environment is adequate.

SPM(IM) - 011: QUESTION: The development contractor software configuration management support tool environment is adequate.

SPM(IM) - 012: QUESTION: The development contractor system software tool environment is adequate.

SPM(IM) - 013: QUESTION: The development contractor application test software tool environment is adequate.

SPM(IM) - 014: QUESTION: The operational support software support tool environment is adequate.

SPM(IM) - 015: QUESTION: The operational support software concept for implementation of software revisions during postdeployment software support is adequate.

SPM(IM) - 016: QUESTION: The operational support concept for implementation audits and reviews during postdeployment software support is adequate.

SOFTWARE PROJECT MANAGEMENT TEST STRATEGIES

SPM(TS) - 001: QUESTION: The TEMP adequately describes the software test and evaluation process.

SPM(TS) - 002: QUESTION: The software test process for DT&E has followed the guidelines in the TEMP.

SPM(TS) - 003: QUESTION: The software test process for OT&E has followed the guidelines in the TEMP.

SPM(TS) - 004: QUESTION: The implementation of the software test process by DT&E and OT&E organizations has been adequate.

SPM(TS) - 005: QUESTION: The test organizations have incorporated a strategy in their software test processes for coordination and sharing of test plans, procedures, and results.

SPM(TS) - 006: QUESTION: The requirements for the development contractor software test strategy are clearly specified in the RFP, SOW, and/or CDRLs.

SPM(TS) - 007: QUESTION: The use of an organization for software test IV&V support has been effective.

SPM(TS) - 008: QUESTION: The overall planning for software testing has been adequate.

SPM(TS) - 009: QUESTION: The software test approach and methodologies employed are clearly described in the software test documentation and appear to be effective.

SPM(TS) - 010: QUESTION: The software features to be tested and not to be tested are clearly described in the software test documentation.

SPM(TS) - 011: QUESTION: The traceability software features tested/not tested to the software functional requirements are described in the software test documentation.

SPM(TS) - 012: QUESTION: The software test deliverables are adequately specified in the software test documentation.

SPM(TS) - 013: QUESTION: The software test criteria used to determine whether each test has passed or failed are clearly specified in the software test documentation.

SPM(TS) - 014: QUESTION: The personnel groups responsible for the software tests are adequately identified in the software test documentation.

SPM(TS) - 015: QUESTION: The high risk assumptions of the software testing approach along with contingency plans for each such assumption are adequately described in the software test documentation.

SPM(TS) - 016: QUESTION: The schedule for software test milestones is adequately specified in the software test documentation.

SPM(TS) - 017: QUESTION: Software testing is adequately prioritized in the software test approach according to mission criticality concerns.

SPM(TS) - 018: QUESTION: The software test environment is adequately identified in the software test documentation and is adequate for accomplishing the required testing.

SPM(TS) - 019: QUESTION: The configuration management of the software test process is adequate.

SPM(TS) - 020: QUESTION: The transition of the software test strategy from the development contractor to the operational support activity has been adequately addressed in the software test documentation and the procurement software test plans.

SOFTWARE PROJECT MANAGEMENT PROJECT INTERFACES

SPM(PI) - 001: QUESTION: The system program office external interfaces are adequate.

SPM(PI) - 002: QUESTION: The implementing external interfaces are adequate.

SPM(PI) - 003: QUESTION: The using command external interfaces are adequate.

SPM(PI) - 004: QUESTION: The operational support activity external interfaces are adequate.

SPM(PI) - 005: QUESTION: The training command external interfaces are adequate.

SPM(PI) - 006: QUESTION: The development contractor external interfaces are adequate.

SPM(PI) - 007: QUESTION: The development test and evaluation (DT&E) organization external interfaces are adequate.

SPM(PI) - 008: QUESTION: The operational test and evaluation (OT&E) organization external interfaces are adequate.

SPM(PI) - 009: QUESTION: The computer resources working group (CRWG) external interfaces are adequate.

SPM(PI) - 010: QUESTION: The test planning working group (TPWG) external interfaces are adequate.

SPM(PI) - 011: QUESTION: The interface control working group (ICWG) external interfaces are adequate.

SPM(PI) - 012: QUESTION: The independent verification and validation (IV&V) agency external interfaces are adequate.

SPM(PI) - 013: QUESTION: The software configuration management interfaces among all activities' management components for the subject system are adequate.

SPM(PI) - 014: QUESTION: The software quality assurance management interfaces among all activities' management components for the subject system are adequate.

SPM(PI) - 015: QUESTION: The contract management interfaces among all activities' management components for the subject system are adequate.

SPM(PI) - 016: QUESTION: The interservice external interfaces with all activities' management components are adequate.

SOFTWARE CONFIGURATION MANAGEMENT IDENTIFICATION

SCM(ID) - 001: QUESTION: The procurement policy, standards, and conventions applied to the identification of software configuration items are adequate.

SCM(ID) - 002: QUESTION: The procurement identification of deliverable software configuration items is adequate.

SCM(ID) - 003: QUESTION: The procurement activity identification of the software configuration baselines is adequate.

SCM(ID) - 004: QUESTION: The system/segment specification adequately identifies elements of the software functional baseline.

SCM(ID) - 005: QUESTION: The performance requirement specifications adequately identify elements of the software allocated baseline.

SCM(ID) - 006: QUESTION: The implementation specifications adequately identify elements of the software product baseline.

SCM(ID) - 007: QUESTION: The identifier characteristics for software configuration item names are adequate.

SCM(ID) - 008: QUESTION: The development contractor internal identifier naming standards/ conventions satisfy contractual regulations.

SCM(ID) - 009: QUESTION: Development contractor identification standards and conventions can be transitioned to operational support standards and conventions.

SCM(ID) - 010: QUESTION: Development contractor deliverable configuration items are named to adequately identify multiple versions and variations.

SCM(ID) - 011: QUESTION: Development contractor identification procedures are structured to permit easy addition, deletion, or modification of configured items at any hierarchical level.

SCM(ID) - 012: QUESTION: Development contractor identification procedures for addition, deletion, and modification of configured items are being followed.

SCM(ID) - 013: QUESTION: The physical medium of configured items is adequately described by the development contractor software component/item identification scheme.

SCM(ID) - 014: QUESTION: The development contractor software identifiers adequately distinguish among different states (e.g., course, object, load, core images, listings) of the software.

SCM(ID) - 015: QUESTION: The development contractor software change control forms are adequate.

SCM(ID) - 016: QUESTION: Subcontractor configuration item identification practices are monitored by the development contractor.

SCM(ID) - 017: QUESTION: The documentation which collectively identifies the content of a configuration item is adequate.

SCM(ID) - 018: QUESTION: Software configured items that implement safety provisions are adequately identified.

SCM(ID) - 019: QUESTION: Software configured items that implement computer/communication security provisions are adequately identified.

SCM(ID) - 020: QUESTION: The identification requirements for postdeployment support are adequately addressed in the CRLCMP.

SCM(ID) - 021: QUESTION: The automated support tools for postdeployment support of configuration identification are adequately addressed in the CRLCMP.

SOFTWARE CONFIGURATION MANAGEMENT CONTROL

SCM(CC) - 001: QUESTION: The procurement policy, standards, and conventions applied to the control of software configuration items are adequate.

SCM(CC) - 002: QUESTION: The procurement activity has implemented adequate software configuration management, based upon regulations, to control the functional and physical characteristics of all CSCIs.

SCM(CC) - 003: QUESTION: The procurement configuration management planning documents contain sufficient guidance for configuration control.

SCM(CC) - 004: QUESTION: The development contractor configuration management activities are adequately monitored by the procurement activity.

SCM(CC) - 005: QUESTION: The procurement configuration control procedures for the Class I and Class II changes (or equivalent categories) are adequate.

SCM(CC) - 006: QUESTION: The use of deviations and waivers by the development contractor which could affect the supportability of the software has been adequately controlled by the procurement activity.

SCM(CC) - 007: QUESTION: The procurement baseline control forms are adequate.

SCM(CC) - 008: QUESTION: The procurement configuration control board procedures are adequate.

SCM(CC) - 009: QUESTION: The procurement procedures for turnover and transfer of configuration control to the operational support activity have been adequately planned.

SCM(CC) - 010: QUESTION: Development contractor configuration control standards and conventions can be transitioned to operational support standards and conventions.

SCM(CC) - 011: QUESTION: The development contractor configuration control board has an adequate interface with the procurement activity configuration control board.

SCM(CC) - 012: QUESTION: The development contractor configuration control board procedures are adequate to distinguish between hardware and software failures.

SCM(CC) - 013: QUESTION: The development contractor configuration control procedures can be transitioned to or are compatible with the operational support activity planned configuration control procedures.

SCM(CC) - 014: QUESTION: The development contractor automated support tools for configuration control of baselines and internal development identifications is adequate.

SCM(CC) - 015: QUESTION: The development contractor software change control forms are adequate.

SCM(CC) - 016: QUESTION: Subcontractor configuration item control practices are monitored by the development contractor.

SCM(CC) - 017: QUESTION: Configured items that implement safety provisions are adequately controlled.

SCM(CC) - 018: QUESTION: Software configured items that implement computer/communications security provisions are adequately controlled.

SCM(CC) - 019: QUESTION: Distribution of configured item changes from the operational support activity to the field is adequately controlled.

SCM(CC) - 020: QUESTION: The configuration control responsibility for integrating computer resources into the system has remained centralized throughout the life of the system.

SCM(CC) - 021: QUESTION: The configuration control requirements for postdeployment support are adequately addressed in the CRLCMP.

SCM(CC) - 022: QUESTION: The operational support configuration control boards are adequately defined to handle software changes.

SCM(CC) - 023: QUESTION: The automated support tools for postdeployment support of configuration control are adequately addressed in the CRLCMP.

SOFTWARE CONFIGURATION MANAGEMENT STATUS ACCOUNTING

SCM(SA) - 001: QUESTION: The procurement policy, standards, and conventions applied to the configuration status accounting of software configuration items are adequate.

SCM(SA) - 002: QUESTION: The procurement activity has implemented adequate software configuration status accounting, based on regulations, to report the functional and physical characteristics of all CSCIs.

SCM(SA) - 003: QUESTION: The procurement configuration management planning documents contain sufficient guidance for configuration status accounting.

SCM(SA) - 004: QUESTION: The procurement activity configuration status accounting procedures are adequate.

SCM(SA) - 005: QUESTION: The development contractor internal configuration status accounting procedures are adequate.

SCM(SA) - 006: QUESTION: The development contractor configuration status accounting has an adequate interface with the procurement activity configuration status accounting.

SCM(SA) - 007: QUESTION: The development contractor configuration status accounting procedures can be transitioned to or are compatible with the operational support activity planned configuration status accounting procedures.

SCM(SA) - 008: QUESTION: The development contractor automated support tools for configuration status accounting of baselines and internal development identifications are adequate.

SCM(SA) - 009: QUESTION: The development contractor software configuration status accounting forms are adequate.

SCM(SA) - 010: QUESTION: Subcontractor configuration item configuration status accounting procedures are monitored by the development contractor.

SCM(SA) - 011: QUESTION: Status of software configuration items that implement safety provisions is adequately reported.

SCM(SA) - 012: QUESTION: Status of software configured items that implement computer/communications security provisions is adequately reported.

SCM(SA) - 013: QUESTION: The configuration status accounting requirements for postdeployment support are adequately addressed in the CRLCMP.

SCM(SA) - 014: QUESTION: The operational support configuration status accounting procedures are adequately defined to handle software change reporting requirements.

SCM(SA) - 015: QUESTION: The automated support tools for postdeployment support of configuration status accounting are adequately addressed in the CRLCMP.

SOFTWARE CONFIGURATION MANAGEMENT AUDIT/REVIEW

SCM(AR) - 001: QUESTION: The procurement policy, standards, and conventions applied to the audit and review of software configuration items are adequate.

SCM(AR) - 002: QUESTION: The procurement activity has implemented adequate software configuration audit/review based on regulations to control the functional and physical characteristics of all CSCIs.

SCM(AR) - 003: QUESTION: The procurement configuration management planning documents contain sufficient guidance for configuration audit/review.

SCM(AR) - 004: QUESTION: The conduct of formal reviews and audits follows a format based on the checklists from MIL-STD-1521B, appropriately tailored for the specific software audit/review.

SCM(AR) - 005: QUESTION: The software product acceptance requirements are adequate.

SCM(AR) - 006: QUESTION: The development contractor internal configuration audit/review process facilitates the development of high quality production software.

SCM(AR) - 007: QUESTION: Configuration audit/review interfaces among procurement, development contractor, and operational support activities are adequate.

SCM(AR) - 008: QUESTION: The development contractor configuration management tool support facilitates the audit/review of the process by which changes are incorporated into configuration identifications.

SCM(AR) - 009: QUESTION: Subcontractor configuration item audit/review practices are monitored by the development contractor.

SCM(AR) - 010: QUESTION: Configured items that implement safety provisions are adequately audited and reviewed.

SCM(AR) - 011: QUESTION: Software configured items that implement computer/communications security provisions are adequately audited and reviewed.

SCM(AR) - 012: QUESTION: The software configuration audit/review requirements for post-deployment support are adequately addressed in the CRLCMP.

SCM(AR) - 013: QUESTION: The automated support tools for postdeployment support of configuration audit/review are adequately addressed in the CRLCMP.

QUESTION NUMBER LIST BY TIME PHASE

This attachment contains a list of the Software Support Life Cycle Process question numbers that should be answerable at the various time phases or milestone reviews.

The reviews are:

SRR	System Requirements Review
SDR	System Design Review
SSR	Software Specification Review
PDR	Preliminary Design Review
CDR	Critical Design Review
TRR (DT&E)	Test Readiness Review for Development Test and Evaluation (About the same timeframe as the Functional Configuration Audit (FCA)
TRR (OT&E)	Test Readiness Review for Operational Test and Evaluation (Normally after the Physical Configuration Audit (PCA) and the Formal Qualification Review/Test (FQR/T))
OT&E	Operational Test and Evaluation

The activities to be emphasized at the appropriate review are:

P	Procurement activities (events/actions/documents that are procurement in nature)
DC	Development Contractor activities (events/actions/documents that are the responsibility of the developer)
OS	Operational Support activities (events/actions/documents that impact the postdeployment software support of a system)

Question Number	SRR	SDR	SSR	PDR	CDR	TRR DT&E	TRR OT&E	OT&E
SPM(PL)-001		P			OS			
SPM(PL)-002			P		OS			
SPM(PL)-003				P	OS			
SPM(PL)-004	P				DC			OC
SPM(PL)-005					P			
SPM(PL)-006				P				
SPM(PL)-007	P				DC		OS	
SPM(PL)-008					p	DC		OS
SPM(PL)-009				P				OS
SPM(PL)-010				P				OS
SPM(PL)-011					P	DC		
SPM(PL)-012					P			OS
SPM(PL)-013		P		OS				
SPM(PL)-014				P				OS
SPM(PL)-015			P		DC			OS
SPM(PL)-016		P						
SPM(PL)-017			P					
SPM(PL)-018	P			DC				OS
SPM(PL)-019							OS	
SPM(PL)-020	P						OS	
SPM(PL)-021	P						OS	
SPM(PL)-022				P			OS	
SPM(PL)-023	P						OS	
SPM(PL)-024	P						OS	
SPM(PL)-025		P					OS	
SPM(PL)-026			P		DC		OS	
SPM(PL)-027			P		DC		OS	
SPM(PL)-028	P				DC			OS
SPM(PL)-029	P			DC				OS
SPM(PL)-030						DC		
SPM(PL)-031						DC		
SPM(PL)-032				DC				
SPM(OS)-001		P		DC				
SPM(OS)-002			P	DC				OS
SPM(OS)-003			P	DC				OS
SPM(OS)-004							ALL	
SPM(OS)-005							P	
SPM(OS)-006							P	
SPM(OS)-007							P	
SPM(OS)-008							DC	
SPM(OS)-009							DC	
SPM(OS)-010								DC
SPM(OS)-011								OS
SPM(OS)-012								OS
SPM(OS)-013								OS
SPM(OS)-014					P		P	
SPM(OS)-015						DC		DC
SPM(OS)-016							OS	OS
SPM(OS)-017				P			P	
SPM(OS)-018				DC			DC	

Question Number	SRR	SDR	SSR	PDR	CDR	TRR DT&E	TRR OT&E	OT&E
SPM(OS)-019					OS			OS
SPM(DM)-001			P					
SPM(DM)-002			P					
SPM(DM)-003				DC				
SPM(DM)-004						OS		
SPM(DM)-005			P-OS					
SPM(DM)-006		P-OS						
SPM(DM)-007				ALL	ALL			
SPM(DM)-008					ALL		ALL	
SPM(DM)-009					P		DC	
SPM(DM)-010						P-OS		P-OS
SPM(DM)-011			DC					
SPM(DM)-012				DC				
SPM(DM)-013					DC			
SPM(DM)-014						DC		
SPM(DM)-015							DC	
SPM(DM)-016	ALL		ALL					
SPM(DM)-017			OS					OS
SPM(DM)-018			OS					OS
SPM(IM)-001						P		
SPM(IM)-002						P-DC		
SPM(IM)-003							OS	
SPM(IM)-004	P							
SPM(IM)-005				DC				
SPM(IM)-006							OS	
SPM(IM)-007						DC		
SPM(IM)-008						DC		
SPM(IM)-009	P							
SPM(IM)-010				DC				
SPM(IM)-011				DC				
SPM(IM)-012				DC				
SPM(IM)-013					DC			
SPM(IM)-014								OS
SPM(IM)-015			OS					OS
SPM(IM)-016							OS	
SPM(TS)-001	P				OS			
SPM(TS)-002							P-OS	
SPM(TS)-003								P-OS
SPM(TS)-004							P	OS
SPM(TS)-005						ALL		
SPM(TS)-006	P-OS							
SPM(TS)-007							P-OS	
SPM(TS)-008			P		DC			OS
SPM(TS)-009			P		DC			OS
SPM(TS)-010			P		DC			OS
SPM(TS)-011			P		DC			OS
SPM(TS)-012					ALL			

Question Number	SRR	SDR	SSR	PDR	CDR	TRR DT&E	TRR OT&E	OT&E
SPM(TS)-013						ALL		
SPM(TS)-014					P-DC			OS
SPM(TS)-015					P-DC			OS
SPM(TS)-016					P-DC	P-DC		
SPM(TS)-017						P-DC		OS
SPM(TS)-018					P-DC			OS
SPM(TS)-019							P-DC	OS
SPM(TS)-020	P							DC-OS
SPM(PI)-001					P			
SPM(PI)-002					P			
SPM(PI)-003							OS	
SPM(PI)-004							OS	
SPM(PI)-005						P-OS		
SPM(PI)-006						DC		
SPM(PI)-007						P		
SPM(PI)-008						P		
SPM(PI)-009					P			
SPM(PI)-010						ALL		
SPM(PI)-011						ALL		
SPM(PI)-012							ALL	
SPM(PI)-013					P-DC			ALL
SPM(PI)-014					P-DC			ALL
SCM(ID)-001	P							
SCM(ID)-002	P							
SCM(ID)-003				P				
SCM(ID)-004		P						
SCM(ID)-005				P				
SCM(ID)-006					DC			
SCM(ID)-007					DC			
SCM(ID)-008					DC			
SCM(ID)-009				DC				
SCM(ID)-010					DC			
SCM(ID)-011				DC				
SCM(ID)-012							DC	
SCM(ID)-013						DC		
SCM(ID)-014				DC				
SCM(ID)-015					DC			
SCM(ID)-016						DC		
SCM(ID)-017							DC	
SCM(ID)-018							DC	
SCM(ID)-019							DC	
SCM(ID)-020			OS					
SCM(ID)-021			OS					
SCM(CC)-001	P							
SCM(CC)-002			P					
SCM(CC)-003	P							
SCM(CC)-004						P		
SCM(CC)-005						P		

Question Number	SRR	SDR	SSR	PDR	CDR	TRR DT&E	TRR OT&E	OT&E
SCM(CC)-006							P	
SCM(CC)-007					P			
SCM(CC)-008						P		
SCM(CC)-009			P					
SCM(CC)-010								DC
SCM(CC)-011								DC
SCM(CC)-012								DC
SCM(CC)-013					DC			
SCM(CC)-014					DC			
SCM(CC)-015					DC			
SCM(CC)-016						DC		
SCM(CC)-017							DC	
SCM(CC)-018							DC	
SCM(CC)-019								OS
SCM(CC)-020								ALL
SCM(CC)-021			OS			OS		
SCM(CC)-022			OS				OS	
SCM(CC)-023							OS	
SCM(SA)-001	P							
SCM(SA)-002			P					
SCM(SA)-003	P							
SCM(SA)-004				P				
SCM(SA)-005						DC		
SCM(SA)-006						DC		
SCM(SA)-007							DC	
SCM(SA)-008					DC			
SCM(SA)-009					DC			
SCM(SA)-010						DC		
SCM(SA)-011							DC	
SCM(SA)-012							DC	
SCM(SA)-013			OS					
SCM(SA)-014							OS	
SCM(SA)-015							OS	
SCM(AR)-001	P							
SCM(AR)-002		P						
SCM(AR)-003	P							
SCM(AR)-004					P			
SCM(AR)-005	P							
SCM(AR)-006					DC			
SCM(AR)-007							DC	
SCM(AR)-008							DC	
SCM(AR)-009						DC		
SCM(AR)-010							DC	
SCM(AR)-011							DC	
SCM(AR)-012			OS					
SCM(AR)-013							OS	

GLOSSARY

The glossary of terms for software supportability life cycle processes are based on a number of sources. Some terms have more than one description. When this is the case, the descriptions either:

a. Are significantly different between sources (though the effective meaning may not be much different).

b. Are used differently (different users or technical language).

c. May be found within the context of a different source.

d. Have real differences in meaning.

The source of each description is indicated by a symbol in parentheses before that source's term description. Examples of the symbols used and corresponding sources are:

(AFOTECP 1) AFOTECP 800-2, Volume 1, Management of Software Operational Test and Evaluation.

(AFOTECP 3) AFOTECP 800-2, Volume 3, Software Maintainability Evaluator's Guide.

(AFOTECP 5) AFOTECP 800-2, Volume 5, Software Support Resources Evaluation Guide.

(AFR 55-43) Air Force Regulation 55-43, Management of Operational Test And Evaluation.

(AFR 80-14) Air Force Regulation 80-14, Test and Evaluation.

(AFR 800-14) Air Force Regulation 800-14, Lifecycle Management of Computer Resources in Systems.

(DoD 80A) Department of Defense Standard 480A, Configuration Control - Engineering Changes, Deviations, and Waivers.

(DoDD 5000.2-M) Department of Defense Directive 5000.2-M, Defense Acquisition Management Documentation and Reports.

(ROWE) Rowe, William, An Anatomy of Risk, John Wiley, 1977.

(CURRENT) Current document definition.

TERMS

Allocated Baseline

(DoD 480A)
See Baseline.

Allocated Configuration Identification

(DoD 480A)
Current, approved performance oriented specifications governing the development of configuration items that are part of a higher level configuration item (CI), in which each specification (1) defines the functional characteristics that are allocated from those of the higher level CI, (2) establishes the tests required to demonstrate achievement of its allocated functional characteristics, (3) delineates necessary interface requirements with other associated configuration items, and (4) establishes design constraints, if any, such as component standardization, use of inventory items, and integrated logistic support requirements.

Application Software

(AFOTECP 5)
The software written by support personnel, or purchased from a contractor, used directly in supporting mission critical computer resources (MCCR). It is normally used for simulation, testing, and MCCR code development.

Automated Software Development Tool

(AFOTECP 5)
A component of the System Software that assists in the design, implementation, documentation, and verification of MCCR software.

Availability

(CURRENT)
A measure of the degree to which an item is in the operable and committable state at the start of the mission when the mission is called for at an unknown (random) time. (MIL-STD-721)

(AFOTECP 5)
The probability that a system is operating satisfactorily at any point in time when used under stated conditions.

Baseline

(DoD 480A)
A configuration identification document or a set of such documents formally designated and fixed at a specific time during a CI's life cycle. Baselines, plus approved changes from those baselines, constitute the current configuration identification. For configuration management, there are three baselines, as follows:

(1) Functional Baseline. The initial approved functional configuration identification.

(2) Allocated Baseline. The initial approved allocated configuration identification.

(3) Product Baseline. The initial approved or conditionally approved product configuration identification.

(ROWE)
A known reference used as a guide for further development activities.

Baseline Profile

(CURRENT)
See Baseline Software Change Profile.

Baseline Software Change Profile

(CURRENT)
The set of numbers (or any subset) determined by specifying the number of change requests per release for each change request category. A change request category is the triple (maintenance type, maintenance priority, maintenance complexity) where maintenance type is correction, enhancement, or conversion; maintenance priority is normal, urgent, or emergency; and maintenance complexity is low, medium, or high.

Baseline Software Supportability Estimate

(CURRENT)
See User/Supporter Baseline Estimate

Block Release

(CURRENT)
See Release.

Change Control

(DoD 480A)
See Configuration Control.

Computer Program

(AFR 800-14)
A series of instructions or statements in a form acceptable to an electronic computer, designed to cause the computer to execute an operation or operations.

Computer Program Configuration Item (CPCI)

(CURRENT)
See Configuration Item. CPCI has been replaced by the term CSCI (below).

Computer Resources

(AFR 800-14)
The totality of computer equipment, computer programs, associated documentation, contractual services, personnel, and supplies.

Computer Resources Lifecycle Management Plan

(AFR 800-14)
The CRLCMP identifies computer resources development strategy, documents the software support concept and the resources needed to achieve that support posture (organizational relationships and responsibilities for management and technical support), identifies the applicable directives (regulations, operating instructions, technical orders, etc.), and defines any changes or new directives needed for operation or support of computer resources in a system.

Computer Resources Working Group (CRWG)

(CURRENT)
A group comprised of all the participating commands (for a particular system) which writes and updates the CRLCMP. The group ensures that necessary elements of the CRLCMP are included in the transfer or turnover agreements.

Computer Software Configuration Item (CSCI)

(CURRENT)
See Configuration Item.

Configuration Audit

(CURRENT)
The process of verifying that all required configuration items have been produced, that the current version agrees with specified requirements, that the technical documentation completely and accurately describes the configuration items, and that all change requests have been resolved.

Configuration Control

(DoD 480A)
The systematic evaluation, coordination, approval or disapproval, and implementation of all approved changes in the configuration of a configuration item after formal establishment of its configuration identification.

Configuration Identification

(DoD 480A)
The current approved or conditionally approved technical documentation for a configuration item as set forth in specifications, drawings and associated lists, and documents referenced therein.

Configuration Index

(CURRENT)
The document produced by the development contractor that reports the current status of configuration item development in terms of specifications and other documents that depend on the configuration, such as qualification Test Plans and Procedures, User Manuals, and the Version Description Document. It lists all Engineering Change Proposals (ECP) and Software Change Notices (SCN) incorporated, approved ECPs not yet incorporated, and other data.

Configuration Item (CI)

(AFR 800-14)

An aggregation of equipment/software, or any of its discrete portions, which satisfies an end use function and is designated by the government for configuration management. CIs may vary widely in complexity, size, and type from an aircraft or electronic system to a test meter of round of ammunition. During development and initial production, CIs are only those specification items that are referenced directly in the contract (or an equivalent in-house agreement). During the operation and maintenance period, any repairable item designated for separate procurement is a configuration item (AFR 65-3).

Configuration Management (CM)

(DoD 480A)
A discipline applying technical and administrative direction and surveillance to (1) identify and document the functional and physical characteristics of a configuration item, (2) control changes to those characteristics, and (3) record and report change processing and implementation status.

Configuration Management Plan (CMP)

(CURRENT)
A document that describes project responsibilities and procedures for implementing CM.

Configuration Management System (CMS)

(AFOTECP 5)
A system applying technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a configuration item, to control changes to those characteristics, and to record and report change processing and implementation status.

Configuration Status Accounting

(DoD 480A)
The recording and reporting of the information that is needed to manage a configuration effectively, including a listing of the approved configuration identification, the status of proposed changes to the configuration, and the implementation status of approved changes.

Consistency

(CURRENT)
A measure of the extent the software products correlate and contain uniform notation, terminology, and symbology.

Contract Logistics Support (CLS)

(AFR 800-21)
CLS is a method used to provide all or part of a system's logistics support by contract throughout its entire lifecycle. CLS is a support concept rather than an acquisition technique.

Critical Issues

(DoDD 5000.2)
Those questions relating to a system's operational, technical, support, or other capability, that must be answered before the system's overall worth can be estimated/evaluated, and that are of primary importance to the decision authority in allowing the system to advance into the next acquisition phase.

Data Item Description

(AFR 800-14)
A form that specifies an item of data required to be furnished by a contractor. This form specifically defines the content, preparation instructions, format, and intended use of each data product.

Descriptiveness

(CURRENT)
A measure of the extent that software products contain information regarding its objectives, assumptions, inputs, processing, outputs, components, revision status, etc.

Development Contractor Activity

(CURRENT)
Those organizations responsible for development of a system in order to achieve an initial operational capability. Organizations include the prime development contractor and any subcontractors to the prime contractor.

Documentation

(AFOTECP 5)
All of the written work describing operating and maintenance procedures for a system.

Engineering Change Proposal (ECP)

(AFR 55-43)
A formal, priced document (DD Form 1692) used to propose changes to the contract provisions and scope, if not partially waived (see Contract Change Proposal), and to the configuration item baseline identification especially when related equipment, critical issues, interfaces, or technical manuals are affected or retrofit is involved. See MIL-STDs 480, 481, and 483 and AFR 400-3.

Evaluation

(AFR 80-14)
The review and analysis of qualitative or quantitative data obtained from design review, hardware inspection, testing, or operational usage of equipment.

(ROWE)
Comparison of an activity performance with the objectives of the activity and assignment of a success measure to that performance.

Evaluation Criteria

(DoDD 5000.2)
Standards by which achievement of required technical and operational effectiveness/suitability characteristics, or resolution of technical or operational issues, may be evaluated. At Milestones I and II, evaluation criteria should include quantitative thresholds for the IOC system. At Milestone III and beyond (or IOC, whichever occurs first), evaluation criteria should include quantitative thresholds for the mature system. If system maturity is greater than 2 years beyond IOC, intermediate evaluation criteria, appropriately time-lined, must also be provided.

Expandability

(CURRENT)
A measure of the extent that a physical change to information, computational functions, data storage, or execution time can be easily accomplished once the nature of what is to be changed is understood.

(AFOTECP 5)
A measure of the ease with which the functional capability of computer hardware or software may be expanded.

Facility

(AFOTECP 5)
The physical plant and the services it provides; specific examples are physical space, electrical power, physical and electromagnetic (TEMPEST) security, environmental control, fire safety provisions, and communications availability.

Firmware

(AFOTECP 1)

(1) Computer programs and data loaded in a class of memory that cannot be dynamically modified by the computer during processing.

(2) Hardware that contains a computer program and data that cannot be changed in its application environment.

Note: Computer programs and data contained in firmware are classified as software; the circuitry containing the computer program and data is classified as hardware (Data and Analysis Center for Software).

Functional Baseline

(DoD 480A)
See Baseline

Functional Configuration Audit (FCA)

(DoD 480A)
The formal examination of functional characteristics test data for a configuration item, prior to acceptance, to verify that the item has achieved the performance specified in its functional or allocated configuration identification.

Functional Configuration Identification

(DoD 480A)
The current approved technical documentation for a configuration item that prescribes (1) all necessary functional characteristics, (2) the tests required to demonstrate achievement of specified functional characteristics, (3) the necessary interface characteristics with associated CIs, (4) the CI's key functional characteristics and its lower level CIs, if any, and (5) design constraints, such as envelope dimensions, component standardization, use of inventory items, and integrated logistics support policies.

Historical Maintenance Profile

(CURRENT)
A histogram of data on software system releases, with the x-axis representing discrete ranges of (available) person-months per change and the y-axis representing the number of software system releases that fall into each x-axis discrete range. For purposes of analysis or illustration, the axes may be reversed.

Independent Verification and Validation (IV&V)

(AFOTECP 1)
An independent assessment process structured to ensure that computer programs fulfill the requirements stated in system and subsystem specification and satisfactorily perform the functions required to meet the user's and supporter's requirements. IV&V consists of three essential elements: independence, verification, and validation:

(1) Independence. An organization/agency which is separate from the software development activity from a contractual and organizational standpoint.

(2) Verification. The evaluation to determine whether the products of each step of the computer program development process fulfill all requirements levied by the previous step.

(3) Validation. The integration, testing and/or evaluation activities carried out at the system/subsystem level to evaluate the developed computer program against the system specifications, and the user's and supporter's requirements (AFR 800-14).

Initial Operational Capability (IOC)

(JCS PUB1)
The first attainment of capability to employ a weapon, item of equipment, or system of approved specific characteristics which is manned or operated by trained, equipped, and supported military unit or force.

Integrated Logistics Support (ILS)

(AFR 800-8)
ILS is a disciplined, unified, and iterative approach to the management and technical activities necessary to (1) integrate support considerations into system and equipment design; (2) develop support requirements that are related consistently to readiness objectives, to design, and to each other; (3) acquire the required support; and (4) provide the required support during the operational phase at a minimum cost.

Interface Control Working Group (ICWG)

(MIL-STD-483)
For programs which encompass a system/HWCI/CSCI design cycle, an ICWG normally is established to control interface activity between contractors or agencies, including resolution of interface problems and documentation of interface agreements.

Interoperability

(AFOTECP 5)

A measure of the degree to which computer hardware/software can interface to and operate with other similar computer hardware/software.

Maintainability

(AFOTECP 5)
The probability that a system out of service for maintenance can be properly repaired and returned to service in a stated elapsed time.

Maintenance (Software Change) Complexity

(CURRENT)
The general degree of difficulty to complete a software change (maintenance) request: high, medium, low.

High: A maintenance action where changes are in requirements, design, code, and test; or greater than 10 percent of a CSCI is affected; or several modules are affected by the change (global changes); or the technical nature of the change requires highly specialized personnel skills; or the level of effort by personnel is large.

Medium: A maintenance action where changes are in design, code, and test; or between 1 percent and 10 percent of a CSCI is affected; or at least two modules are affected by the change (semilocal); or the level of effort by personnel is average.

Low: A maintenance action where changes are isolated to only one unit (e.g., one module/compilation unit) of code; or no more than 1 percent of a CSCI is affected; or the level of effort by personnel is minimal (small).

Maintenance Documentation

(AFOTECP 5)
The documentation that describes the maintenance of computer system hardware and software.

Maintenance (Software Change) Priority

(CURRENT)
The criticality of the software change (maintenance) request in order to preserve mission readiness: emergency, urgent, and normal.

Emergency: A maintenance action requiring all available personnel's dedicated effort to correct the problem as soon as possible (e.g., 24 hours); mission impact - mission termination or severe degradation, no workaround.

Urgent: A maintenance action requiring next "block release" turnaround; mission impact - degraded, requires workaround.

Normal: A maintenance action not in the Emergency or Urgent categories; mission impact - not degraded but inconveniences occur.

Maintenance Profile

(CURRENT)
See Historical Maintenance Profile.

Maintenance (Software Change) Request Category

(CURRENT)
The identification of a software change (maintenance) request by specification of the maintenance type, priority, and complexity.

Maintenance (Software Change) Type

(CURRENT)
The type of software change (maintenance) action required to complete a software change (maintenance) request: conversion, enhancement, and correction.

Conversion (Adaptation): Any change/effort to a software system that is initiated as a result of changes in the environment (e.g., hardware, system software) in which the software system must operate.

Enhancement (Perfective): Any change, insertion, deletion, modification, or extension made to a software system to meet the evolving needs of the user.

Correction: Any change that is necessitated by actual faults (induced or residual) in a software system.

Modularity

(CURRENT)
A measure of the extent that a logical partitioning of software produces into parts, components, and/or modules has occurred.

Mission Critical Computer Resources (MCCR)

(AFOTECP 1)
Computer resources incorporated as integral parts of, dedicated to, required for direct support of, or for the upgrading or modification of major or less than major system(s). Excludes are automated data processing (ADP) resources as defined and administered under AFR 300 series (USAF/RD/ LE Policy Letter, 13 October 1981).

Mission Critical Computer System (MCCS)

(AFOTECP 1)
(1) A computer that is integral to an electromechanical system and that has the following key attributes:

(a) Physically incorporated into a large system whose primary function is not data processing.

(b) Integral to, or supportive of, a larger system from a design, procurement, and operational viewpoint.

(c) Inputs include target data, environmental data, command and control, etc.

(d) Outputs include target information, flight information, control signals, etc.

(2) In general, an MCCS is developed, acquired, and operated under decentralized management (DoD Directives 5000.1 and 5000.2).

Operational Support Activity

(CURRENT)
Those organizations responsible for postdeployment operation and support of a system. Organizations include the using command, supporting command, contractors (if used), and test and evaluation agencies (if used).

Operational Effectiveness

(DoDD 5000.1)
The overall degree of mission accomplishment of a system used by representative personnel in the context of the organization, doctrine, tactics, threat (including countermeasures and nuclear threats), and environment in the planned operational employment of the system.

Operational Suitability

(DoDD 5000.1)
The degree to which a system can be placed satisfactorily in field use with consideration being given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human factors, manpower supportability, logistics, supportability, and training requirements.

Person-Months per Change (PMPC)

(CURRENT)
Available PMPC: Raw personnel resources workload to support a user/supporter baseline workload estimate of a specified number of changes. Computed as the number of full-time equivalent personnel, times the release cycle in months, divided by the total number of changes.

Estimated PMPC: An estimate of personnel resources workload required to support the user/supporter baseline estimate. This estimate is computed by using a regression equation whose coefficients are derived from historical maintenance release data.

Evaluated PMPC: A realistic estimate of personnel resources workload effectiveness to support the user/supporter baseline estimate as derived from an evaluation of the software supportability characteristics.

Personnel

(CURRENT)
See Support Personnel.

Physical Configuration Audit (PCA)

(DoD 480A)
The formal examination of the "as-built" configuration of a unit of a CI against its technical documentation in order to establish the CI's initial product configuration identification.

Probability

(ROWE)

A numerical property attached to an activity or event whereby the likelihood of its future occurrence is expressed or clarified.

Probability Distribution

(ROWE)
The representation of a repeatable stochastic process by a function satisfying the axioms of probability theory.

Probability of Occurrence

(ROWE)
The probability that a particular event will occur, or will occur in a given interval.

Procurement Activity

(CURRENT)
Those government organizations responsible for ensuring delivery of a production system. Organizations include the program office, implementing command, development and operational test and evaluation agencies, and appropriate independent verification and validation agencies if used.

Product Baseline

(DoD 480A)
See Baseline

Product Configuration Identification

(DoD 480A)
The current approved or conditionally approved technical documentation that defines the configuration of a CI during the production, operation, maintenance, and logistics support phases of its life cycle, and that prescribes (1) all necessary physical or form, fit, and function characteristics of a CI, (2) the selected functional characteristics designated for production acceptance testing, and (3) the production acceptance tests.

Program Management Directive (PMD)

(AFR 800-14)
The official HQ USAF management directive used to provide direction to the implementing and participating commands and satisfy documentation requirements. It will be used during the entire acquisition cycle to state requirements and request studies as well as initiate, approve, change, transition, modify, or terminate programs. The content of the PMD, including the required HQ USAF review and approval actions, is tailored to the needs of each individual program (AFR 800-2).

Program Management Responsibility Transfer (PMRT)

(AFR 800-14)
That point in time when the designated Supporting Command accepts program management responsibilities from the Implementing Command. This includes logistic support and related engineering and procurement responsibilities (AFR 800-4).

Program Support Tools

(AFOTECP 3)
General debug aids, test/retest software, trace software/hardware features, use of compiler/link editor, library management/configuration management/text editor/display software tools.

Program Test Plan

(AFOTECP 3)
Set of descriptions and procedures for how the program is to be (or can be or has been) tested.

Quality Assurance (QA)

(CURRENT)
All actions that are taken to ensure that a development organization delivers products that meet performance requirements and adhere to standards and procedures.

Release

(CURRENT)
A version of a software system representing either the initial baseline configuration or an update to a previous version that incorporates a defined set of software change requests. Each release becomes a new baseline.

Release Engineering Completion Date

(CURRENT)
The date when the software engineering activity for a release is complete. The software engineering activity includes configuration management, quality assurance, and software maintenance project phases of requirements, design, code, unit test, integration test, and operational test. Activities including "kit proofing," prom burning, and in general, technical order modifications which typically occur between engineering completion and field implementation (distribution) are not included.

Release Field Date

(CURRENT)
The date when a software system release is officially distributed and implemented in the field for operational use.

Release ID

(CURRENT)
A unique identifier for a software system release.

Release Start Date

(CURRENT)
The date when major analysis activity related to a specified release begins for which software support resources are required.

Reliability

(ROWE)
The probability that the system will perform its required functions under given conditions for a specified operating time.

Requirements Correlation Matrix (RCM)

(AFR 57-1)
A management tool that provides a single source of traceability and comparison of the user's system requirements, contractual specifications, and operational evaluation criteria.

Risk

(ROWE)
The potential for realization of unwanted, negative consequences of an event.

Risk Acceptance

(ROWE)
Willingness of an individual, group, or society to accept a specified level of risk to obtain some gain or benefit.

Risk Assessment

(ROWE)
The total process of quantifying a risk and finding acceptable level of that risk for an individual, group, or society. It involves both risk determination and risk evaluation.

Risk Assessment Methodology for Software Supportability (RAMSS)

(CURRENT)
A method of determining the disparity between the estimated risk (determined from the support concept, baseline software supportability profile, and historical maintenance profile) and evaluated risk (determined from a conversion of the software supportability evaluation metrics, software product maintainability, software support resources, and software support life cycle processes).

Simplicity

(CURRENT)
A measure of the extent that software products reflect the use of singularity concepts and fundamental structures in organization, language, and implementation techniques.

Simulation

(AFR 800-14)
The representation of physical systems of phenomena by computers, models, or other equipment.

Site

(CURRENT)
A software support site, of particular location, where software support activity is being accomplished. Includes sites such as the Air Logistics Centers (ALC).

Software

(AFOTECP 1)

A set of computer programs, procedures, and associated documentation concerned with the operation of a data processing system.

(CURRENT)
The programs that execute in a computer. The data input, output, and controls upon which program execution depends and the documentation which describes, in a textual medium, development and maintenance of the program.

Software Change Request

(CURRENT)
An official request that could involve a change to a software system. Such requests include problem reports, enhancement requirements, modification requests, or any other forms that are officially tracked by a configuration management function.

Software Configuration Management

(CURRENT)
A discipline applying technical and administrative direction and surveillance to (1) identify and document the functional and physical characteristics of a configuration item, (2) control changes to those characteristics, and (3) record and report change processing and implementation status.

Software Delivery

(CURRENT)
That point in the software life cycle when the software support function assumes responsibility for the "next" set of configuration changes to the software (e.g., nest block release). This point is logically no later than PMRT, but could be as early as IOC. This applies when a contractor or government agency assumes the software support function.

Software Error

(CURRENT)
The human decision (inadvertent or by design) that results in the inclusion of a fault in a software product.

Software Fault

(CURRENT)
The presence or absence of that part of a software product that can result in software failure.

Software Life Cycle Process

(CURRENT)
The policy, methodology, procedures, and guidelines applied in a software environment to the software development and support life cycle activities.

Software Maintainability

(AFOTECP 1)
The ease with which software can be changed in order to:

(1) Correct errors.

(2) Add/modify system capabilities through software changes.

(3) Delete features from programs.

(4) Modify software to be compatible with hardware changes.

(CURRENT)
A quality of software that reflects the effort required to perform software maintenance actions.

Software Maintenance

(CURRENT)
Those actions required for:

(1) Correction - Removal, correction of software faults.

(2) Enhancement - Addition/deletion of features from the software.

(3) Conversion - Modification of the software because of environment (data, hardware) changes.

Software Maintenance Environment

(CURRENT)
An integration of personnel, support systems, and physical facilities for the purpose of maintaining software products.

Software Maintenance Project Management

(CURRENT)
The software life cycle process management applied during the support phase for the software to accomplish specific software maintenance tasks that derive from software problem reports or change requests.

Software Management

(CURRENT)
The policy, methodology, procedures, and guidelines applied in a software environment to the software development/maintenance activities. Also, those personnel with software management responsibilities.

Software Maturity

(CURRENT)
Software maturity is a measure of the software's evolution toward satisfying all documented user requirements.

Software Project Management

(CURRENT)
See Software Management.

Software Project Management Design Methods

(CURRENT)
The software project management process utilizes design methods that enhance software supportability to the extent that design methodology standards and conventions are (1) documented, followed, and validated through quality assurance; (2) can be transitioned to the support activity; and (3) produce adequate design specifications that reflect supportability characteristics.

Software Project Management Implementation Methods

(CURRENT)
The software project management process utilizes implementation methods that enhance software supportability to the extent that implementation/coding/testing methodology, standards, and conventions are (1) documented, followed, and validated through quality assurance; (2) can be transitioned to the support activity; and (3) produce supportable production products.

Software Project Management Organizational Structure

(CURRENT)
The software project management process organizational structure enhances software supportability to the extent that the physical structure, functional responsibilities, external interfaces, and assigned personnel provide for continuity over the software life cycle phases and have proper interfaces with organizations responsible for software support.

Software Project Management Planning

(CURRENT)
The software project management process utilizes planning that enhances software supportability to the extent that plans for the development, test, product transfer, and operational support exist have been implemented, have been appropriately coordinated across activities, and satisfy contractual and/or regulation requirements.

Software Project Management Project Interfaces

(CURRENT)
The software project management possesses organizational interfaces that enhance software supportability to the extent that external project organizational relationships and responsibilities are (1) defined, (2) provide a valuable functional role, and (3) contribute to systematic cost effective procurement, development, and operational support processes.

Software Project Management Test Strategies

(CURRENT)
The software project management process utilizes strategies that enhance software supportability to the extent that the test plans, descriptions, procedures, and results have been (1) documented, (2) can be transitioned to the support activity, and (3) provide for a consistent and systematic process for verifying and validating that software requirements have been satisfied.

Software Reliability

(CURRENT)
A quality of software that reflects the probability of failure free operation of a software component or system in a specified environment for specified time.

Software Portability

(CURRENT) A quality of software that reflects the effort required to transfer the software from one environment (hardware and system software) to another.

Software Support Concepts

(CURRENT)
The estimated support personnel resources, level of dedication and expertise of the support personnel, and the duration of the block release cycle.

Software Support Facility

(AFOTECP 5)
The facility which houses and provides services for the support systems and personnel required to maintain the software for a specific MCCS.

Software Support Personnel

(CURRENT)
See Support Personnel.

Software Support Resources

(CURRENT)
The totality of personnel, systems, physical facilities, and calendar time that are used/consumed during a software release effort.

Software Supportability

(CURRENT)
A measure of the adequacy of software products, resources, and procedures to facilitate:

(1) Modifying and installing software.

(2) Establishing an operational baseline.

(3) Meeting user requirements.

Software Supportability Evaluation

(CURRENT)
An evaluation to derive a measure of how well a software system can be supported. (See Software Supportability.)

Software Supportability Evaluation Metrics

(CURRENT)
The closed-form questionnaire scores for each software supportability characteristic in a software supportability evaluation as well as the values computed by cumulating lower level scores.

Software Supportability Negative Outcome

(CURRENT)
Any outcome for which the software support resources are not adequate to accomplish required software support.

Software Supportability Risk

(CURRENT)
The probability at a given point during the software support phase that the software maintenance activity specified by a baseline software supportability profile cannot be accomplished with the available software support resources.

Estimated Software Supportability Risk: An estimate of the software supportability risk determined by the area under a normal distribution curve. The area representing risk is that part under the curve greater than the subject software's available person-months per change value as computed from the software support concept and baseline software change profile. The normal distribution curve is determined by using the estimated person-months per change as the mean and the standard deviation of the form an estimated person-months per change regression equation. (See Risk Assessment Methodology for Software Supportability.)

Acceptable Software Supportability Risk: The estimated software supportability risk that is agreed upon by the user (using command) and supporter (supporting command) as result of the baseline software supportability agreement.

Evaluated Software Supportability Risk: An approximation to the software supportability risk computed from the software supportability evaluation metrics. The computation is derived from a linear regression model using the software life cycle process, software product maintainability, support personnel, support systems, and support facilities as the five regression equation factors.

Measured Software Supportability Risk: See Evaluated Software Supportability Risk.

Software System

(CURRENT)
A set of software (specifications, programs, and data) that constitutes a well-defined major function of group of functions.

Typical Systems include avionics operational flight programs (OFP), ground based communications, missile guidance, simulation, threat generators, automatic test equipment (ATE), and electronic warfare (EW).

Software System Type

(CURRENT)
One of seven classifications of a software system's primary functional mission: ATD, ATE, C-E, EW, OFP, SIM, and SUP.

ATD: Aircrew Training Device or Operational Flight Trainer (Weapon System Trainer) for training and support of an operational system, usually in the form of a replicated cockpit and instructor/operator station.

ATE: Automatic Test Equipment software to support the testing of hardware units under test (UUT), create and maintain the environment where the test software may be used, or prepare/analyze/maintain test software.

C-E: Communications-Electronics software for command and control, communications, surveillance and warning, air traffic control, intelligence, and other related functions.

EW: Electronic Warfare software that involves the use of electromagnetic energy and performs functions either separate or integral to a larger airborne or ground system.

OFP: Operational Flight Program software/firmware that is integral to an on-board aircraft computer system including navigation, flight control, fire control, weapon delivery, electronic engine control, and heads-up display (HUD).

SIM: Simulation Software not included as part of the ATD.

SUP: Support Software including application support software and system support software not included in any other category.

Specification Change Notice (SCN)

(CURRENT)
The SCN is used to distribute approved page changes to authorized users of baseline documents who, in turn, are responsible for posting the updates.

Source Code

(CURRENT)
The form of the program code in its source language.

Standards

(AFOTECP 3)
Procedures, rules, and conventions used for prescribing disciplined program design and implementation.

Support Concept

(CURRENT)
The software support concept usually specified as part of the CRLCMP. Also includes that part of the support concept necessary to establish the acceptable risk from a baseline software change profile: standard release duration, number of support personnel, average skill level, percentage of personnel dedicated to releases, support facility, etc.

Support Facility

(CURRENT)
The physical facility resources that must be available for the other software support resources to accomplish a specific task.

Support Personnel

(CURRENT)
A general term for personnel (military, DoD civilian, or DoD contractor) whose skills are necessary to directly support MCCS software maintenance. Includes but is not limited to management, technical and nontechnical support, and contractor personnel.

Support System

(AFOTECP 5)

Any automated system used to change, test, or manage the configuration of MCCS software and associated documentation. Includes but is not limited to host processors, software bench processors, laboratory-integrated test facilities, operational-integrated test facilities, and automated configuration management systems.

Support System Facility

(AFOTECP 5)
See Support Facility.

System Software

(AFOTECP 5)
All of the software that is part of the software support facility computer system. It is never or seldom accessed directly by software support personnel. It controls the processing of application software. It includes operating systems, source code editors, language translators, link editors/loaders, librarian/file managers, data base managers, and automated software development tools.

Testability

(AFOTECP 3)
A measure of the extent that software products contain aids that enhance testing.

Test and Evaluation Master Plan (TEMP)

(DoDD 5000.2-M)
The TEMP is the basic planning document for all test and evaluation (T&E) related to a particular system acquisition and is used by the Office of the Secretary of Defense (OSD) and all DoD Components in planning, reviewing, and approving T&E. The TEMP provides the basis and authority for all other T&E planning documents.

Traceability

(AFOTECP 3)
A measure of the extent that information regarding all program elements, and their implementation, can be traced between all levels of lesser and greater detail (e.g., up or down in the system documentation hierarchy).

Uncertainty

(ROWE)
The absence of information; that which is unknown.

User/Supporter Baseline Estimate

(CURRENT)
A set of conditions agreed upon by the user and supporter of a given MCCS that represents the best estimate of the expected Baseline Software Change Profile for the first (one to three) releases after Software Delivery and the planned or best estimate of the Software Support Concept.

Verification/Validation (of computer programs)

(AFR 800-14) The process of determining that the computer program was developed in accordance with the stated specification and satisfactorily performs, in the mission environment, the functions for which it was designed.